Alabama Pediatric Health Access Network (ALPHA Network)

Laying the Foundation to Improve Pediatric Specialty Care Access for Alabama's Rural Healthcare

Submitted to: FCC Grant Proposal (WC Docket No. 02-60)

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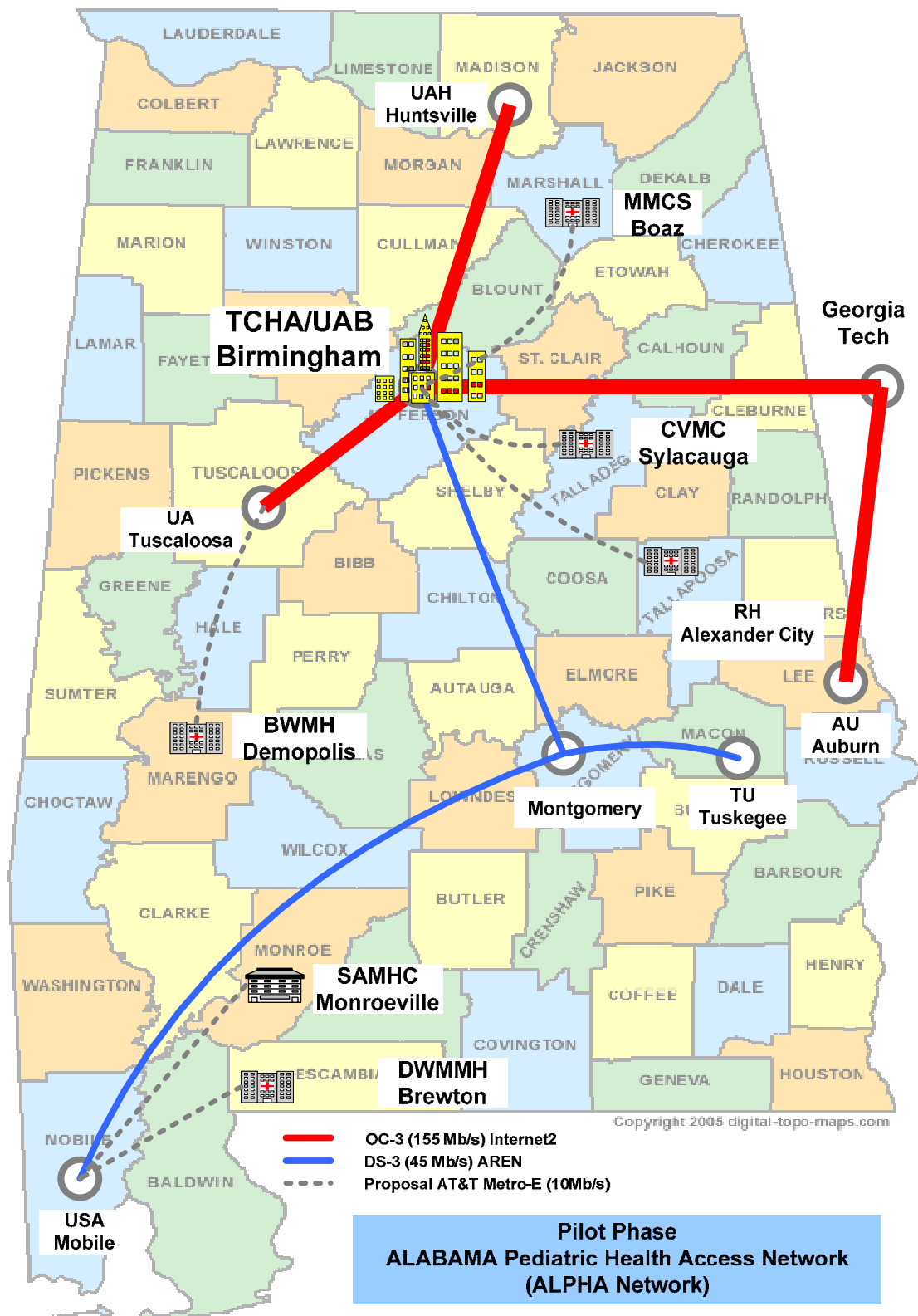Office tel: (205) 212-7863 - Work cell: (205) 948-6848
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Pilot Phase
ALABAMA Pediatric Health Access Network
(ALPHA Network)

Executive Summary - Alabama Pediatric Health Access Network (ALPHA Network) Pilot Project

1. Organization legally and financially responsible for the conduct of activities supported by the fund
   - The Children's Hospital of Alabama, Birmingham, AL 35233
2. Goals and objectives of the proposed network
   - Goal 1: Improve timely access to pediatric subspecialty in rural areas
   - Goal 2: Improve rural healthcare facility's ability to manage patients locally and minimize the delays in treatment at the point-of-care.
     - i. Objective 1: Expand current telemedicine program to provide timely rural health access to pediatric specialty care and services by providing broadband access and connectivity for teleconsultation
     - ii. Objective 2: Upgrade the existing rural telepsychiatry infrastructure by increasing the bandwidth and quality of service
3. Estimated total cost for ALPHA Network
   - Year 1 = $290,480
   - Year 2 =$204,480

Summary of Budget for ALPHA Network Pilot Project		
Monthly Charges	Comm	$17,040
Yearly (12 months)	Comm	$204,480
Project duration (24 months)	Comm	**$408,960**
Non-recurring (Firewall Install & Config)	Equipment	$48,000
	AT&T Installation	$12,000
	TCHA Upgrade	$1,000
	Internet2 Fee	$25,000
Total Non-recurring		**$86,000**
Year 1 Total Cost		$290,480
Year 2 Total Cost		$204,480
Total Cost for entire Project Period		**$494,960**

4. Description of network participants who will fund shared network costs
   - Pilot hospitals will pay for 15% of the cost ($74,094)
5. Source of financial support and anticipated revenues that will pay for costs not covered by the fund;
   - TCHA will pay for the 15% costs to:
     i. SAMHC for upgrading existing infrastructure
     ii. Connection to Internet2
     iii. Upgrade of TCHA broadband to Internet2 to 1GbE
   - Pilot Hospitals will pay 15% costs to:
     i. Connection to Internet2
6. Health care facilities included in the ALPHA Network

Hospital	Address	Zip code	Telephone	RUCA 2006 Codes 2.0
Children's Hospital of Alabama	1600 7th Avenue South, Birmingham, AL	35233	205.212.7863	1
Marshall Medical Center South	2505 US Highway 431 South, Boaz, AL	35957	256.593.8310	4
Coosa Valley Medical Center	315 West Hickory South, Sylacauga, AL	35150	256.249.5000	4
Bryan Whitfield Memorial Hospital	150 US Highway 80, Demopolis, AL	36732	334.289.4000	7
Russell Hospital	3316 Highway 280, Alexander City, AL	35010	256.329.7100	7
Southwest Alabama Mental Health Center	378 West Claiborne St., Monroeville, AL	36460	251.575.4203	7
D.W. McMillan Memorial Hospital	1301 Belleville Ave Brewton, AL	36426	251.867.8061	7

7. Previous experience in developing and managing telemedicine programs
   - 2002, TCHA began its teleradiology program. Today, TCHA is remotely reading pediatric radiology images from 4 community hospitals as well as several ambulatory practices in the State of Alabama and in part of Georgia.
   - 2003, TCHA began its telepsychiatry program. Today, TCHA is connected to one rural mental health center (Brewton, AL) and one urban mental health center (Montgomery, AL)
8. Provide a project management plan outlining the project's leadership and management structure, as well as its work plan, schedule, and budget;
   i. ALPHA Network Steering Committee

ALPHA Network Steering Committee	Title	Organization
Feliciano Yu, MD, MS	Medical Informaticist, Principal Investigator (PI)	TCHA
Helmuth Orthner, PhD	Professor, Co - PI	UAB Health Informatics Department
Peter Glaeser, MD	Director, Emergency Medicine Division	TCHA
Tom Vaughan, MD	Director, Telepsychiatry Program	TCHA
Jennifer McCain, MD	Pediatric Emergency Medicine	TCHA
Suzanne Respess	Directory, Government Relations	TCHA
Mike McDevitt	Chief Information Officer	TCHA
Marsha Raulerson, MD	Pediatrician	D.W. McMillan Memorial Hospital
Frank Harris	Administrator	Russell Hospital

Glenn Sisk	Chief Executive Officer	Coosa Valley Medical Center
Candace Harden	Director	Southwest Alabama Mental Health Center
John Anderson	Administrator	Marshall Medical Center South
Michael Marshall	Administrator	Bryan Whitfield Medical Center
Phillip Wood	Manager, Network Services	TCHA
Kelvin Knight	Director, Biomedical Services	TCHA
Pam Atkins	Director, Information Technology	TCHA
Justin Fincher	Audio/Visual Specialist	TCHA
Bill Herrin	Director, Information Technology	Marshall Medical Center South
Austin Mann	Network Specialist	Marshall Medical Center South
Hoyt Childs, MD	Director, Emergency Medicine Division	Marshall Medical Center South
Debbie Stanford, MD	Director, Emergency Medicine Division	Coosa Valley Medical Center
Robert Cloud	Executive Director	UAB Infrastructure Services
Jim Dearth, MD	CEO	TCHA

- Work plan and Schedule

Timeline	Year 1 Q1	Q2	Q3	Q4	Year 2 Q1	Q2	Q3	Q4
1. Project Initiation								
a. Convene Steering Committee	x	x	x	x	x	x	x	x
b. Identify Key Resources	x							
i. Space	x							
ii. Equipment	x	x						
c. Determine Methods for Deployment, Testing and Evaluation				x	x			
d. Determine Strategy for Sustainability				x	x	x		
2. Initiate Key Technology Partners	x			x				
a. Equipment Acquisition	x			x				
b. Contract	x			x				
c. Shipment	x	x		x	x			
d. Distribution to participants	x	x		x	x			
e. Installation	x	x		x	x			
3. Developing of format for Teleconsultation								
a. Software Application		x	x	x	x	x	x	
b. Policy and Procedures		x	x	x	x	x		
c. End-user workflow gap analysis			x	x	x	x	x	
4. Functional Testing of Telemedicine Activities								
a. Software Application	x	x	x	x	x	x	x	x
b. Hardware	x	x						
c. Process	x	x	x	x	x	x	x	x
5. Evaluation (cost, process, outcomes)								
a. End-user feedback	x	x	x	x	x	x	x	x
b. Monitoring Quality of Service	x	x	x	x	x	x	x	x
c. Maintenance	x	x	x	x	x	x	x	x
d. End of project Assessment				x			x	x
6. Future Expansion and Sustainability								
a. Services						x	x	x
b. Sites						x	x	x

9. Coordination of telemedicine program throughout the state and strategy for sustainability
   Program Coordination:
   - The coordination of telehealth programs within the region will be the responsibility of the ALPHA Network Steering Committee. Through its

leadership councils, the project will make certain that all efforts within the region are harmonized and coordinated to reduce duplication of efforts
- TCHA will be the hub for pediatric subspecialty access to rural health centers in the region
- Expand linkages to all rural hospitals willing to participate, link with UAB Health System, plan to use infrastructure as conduit for AL Medicaid transformation project (a regional health information exchange project)

Sustainability strategies:
- Increase adoption and usage by focusing on patient care needs
    i. Initial focus on pilot project
    ii. Rapid assessment for future clinical services
- Engaging and supporting clinician end-users of the system
    i. Technical support
    ii. Communication
    iii. Workflow efficiencies
    iv. Enhancement of technology/equipment
- Determine staffing and technical resource requirements and develop/build up local or in-house expertise
- Determine necessary technical requirements and specifications necessary for supporting clinical services and develop a scalable technical infrastructure for future telemedicine applications (hardware, software, infrastructure)
- Pursue and explore funding mechanisms, such as:
    i. Government funding/support
    ii. Facility or partner organization operating funds
    iii. Other grant funding
    iv. Alternative funding/payment for end-users
    v. Community or charitable donations
    vi. Private/Public partnerships
    vii. In-Kind contributions
    viii. Network membership fees
    ix. Third-party fees for network use
    x. Subsidization from other revenue generating projects or initiatives
    xi. Hardware or software commercialization and sales (unique products developed for project)

Introduction

The American Academy of Pediatrics recognized telemedicine as vital to providing access to pediatric specialists and services, particularly for those children residing in medically underserved areas.[1] The Institute of Medicine's Future of Emergency Care identified gaps in the quality of care delivery within the country's emergency departments. The gaps include silos of care, fragmented services, poor communication in and out of hospitals, as well as the lack of available on-call specialists, particularly pediatric emergency services.[2] Without sufficient infrastructure, rural communities struggle to maintain basic access pediatric specialty services, limited resources for first responder services, and timely consultations with pediatric specialists particularly in urgent settings.[3]

As one of the nation's leading centers for pediatric medicine and healthcare, the Children's Hospital of Alabama (TCHA) is dedicated to the goal of increasing access to and providing availability of pediatric services to the medically and specialty underserved areas within the State of Alabama and the surrounding region. Its pediatric faculty and medical staff rank among the best in the nation in academic research as well as through the practice of leading-edge medicine and the provision of outstanding health care services. Being the only freestanding pediatric hospital and Level-1 pediatric trauma center in the State of Alabama, TCHA is an integral part of its commitment to the health and safety of the statewide community it serves. TCHA works to ensure adequate access to medical and health care services for underserved populations in both urban and rural areas. TCHA's goal for promoting telemedicine is two-fold, 1) Improve timely access to pediatric subspecialty in rural and outlying areas, and 2) Improve rural healthcare's ability to manage patients locally, minimizing effects of delay in treatment at the point-of-care.

TCHA has existing telehealth projects that are addressing the growing need for pediatric specialty of the community and the region. In 2002, TCHA initiated a teleradiology project, where pediatric radiologists read the community's and the region's pediatric radiographic remotely. In 2003, a telepsychiatry initiative was started to link pediatric mental health specialists to the rural mental health communities.

For this proposal, TCHA aims to 1) expand its current telehealth programs to include timely rural health access to pediatric specialty care and services through teleconsultation, and 2) upgrade the existing rural telepsychiatry infrastructure by increasing the bandwidth and quality of services for voice and video conferencing.

Specifically, TCHA aims to implement a pilot telemedicine program that will link the Emergency Department at Children's Hospital to four hospital emergency departments that individually and collectively serve significant rural and medically underserved Alabama population. This initiative is envisioned as the first phase of a comprehensive, statewide telemedicine program that will provide pediatric consultation to every emergency room in the state, and eventually act as a conduit for expanding 24/7 access to the hospital's wide range of pediatric services as well as pediatric subspecialists.

TCHA will be legally and financially responsible for the conduct of activities supported by the fund. The estimated cost of the entire project is $494,960 and TCHA is prepared to fund its part of the 15% shared responsibility of the project. The participating hospitals have also expressed and fully support the shared costs.

Funding of this pilot project will enable Children's Hospital to develop strategies to enhance its telemedicine outreach capabilities initially for pediatric emergency medicine services, and in the future, serve as a gateway for expanding access to pediatric subspecialty services to the medically underserved areas of the State of Alabama and the surrounding region.

Overview of The Children's Hospital of Alabama (TCHA)

The Children's Hospital of Alabama (TCHA) is the primary operational component of a private, not-for-profit health care delivery system also known as the Children's Health System (CHS). In addition to the 275-bed Hospital, TCHA is comprised of 16 pediatric care offices and three satellite subspecialty facilities strategically located to conveniently serve patients who reside outside the Birmingham/Central Alabama region.

TCHA was established in 1911 with just 12 beds and has now grown to become Children's Health System – the 10th busiest pediatric medical center in America. TCHA treats ill and injured children from across the state, throughout the nation and around the world. TCHA is home to a leading pediatric hematology/oncology center and a pediatric stem cell transplant program whose annual patient population includes 100 new cases of leukemia/lymphoma/solid tumors, 70 patients newly diagnosed with brain tumors, 30 patients who receive bone marrow transplants, 15 patients newly diagnosed with plasma bleeding disorders, 560 newly diagnosed with hematology blood disorders and 40 newly diagnosed with sickle cell disorders.

TCHA is also home to a kidney dialysis center geared totally to pediatrics, has ground and mobile intensive care units used by the Critical Care Transport Team to transport 876 children to Children's last year from hospitals and communities across the state. TCHA has a multi-specialty Diagnostic Center, Emergency Department with a Level 1 Trauma Center and one of the largest pediatric outpatient centers in the nation. It is home to the Regional Poison Control Center, the Southeast Child Safety Institute, the Alabama Chapter of SAFE KIDS and Think First Alabama. TCHA is Birmingham's 10th largest hospital (based on licensed beds) and is the metropolitan area's 12th largest employer (based on number of local employees).

TCHA houses the Children's Center for Research and Innovation, where researchers and medical professors are working toward both cures and prevention for pediatric illness and disease and is the largest pediatric burn center in the Southeast. TCHA cares for critically ill babies, including preemies weighing as little as one pound, four ounces. TCHA extends its services to 16 additional sites throughout Alabama. More than 40 percent of our patients come from outside the greater Birmingham area – in fact, from every county in our state. As a private, not-for-profit hospital governed by a volunteer board of trustees, TCHA is the only freestanding pediatric hospital in Alabama. TCHA is the primary site for all pediatric educational programs and patient care activities within the University of Alabama at Birmingham (UAB) Medical Center and its Departments of Pediatrics, Pediatric Surgery and Pediatric Neurosurgery (among others). Last year, TCHA admitted 13,838 patients in the hospital, saw 614,708 patients in the ambulatory setting (about 56 percent of all children in Alabama under the age of 18), cared for 326,706 visits in the off-site centers, and encountered 49,766 patient visits in our emergency department. About 42% of our patients are Medicaid beneficiaries.

TCHA Information technology Division

The Information Technology Department of The Children's Hospital of Alabama consists of 60 staff members spread across various areas of responsibility – Applications Support, Network Services, System Integration and Customer Support. Currently, IT supports a 3000-plus drop network, 150 servers supporting in excess of 85 different applications. They also support 2200 devices consisting of desktops, laptops and tablets. We do have a fully-deployed wireless infrastructure which includes a separate wireless system for our guests, i.e., patients and families.

The TCHA "campus" that is supported by IT, includes the main hospital in downtown Birmingham, AL, as well as Children's South, which is located approximately 12 miles south of the city and is an outpatient surgery/clinic facility. Also supported is the infrastructure and staff at 12 private practices spread between Montgomery, AL, and Huntsville, AL.

TCHA's IT Department is recognized nationally as a technology leader in healthcare. For 3 out of the last 5 years, we have been elected to the Top 100 among "Healthcare's Most Wired". Within the state of Alabama, our Network Services Manager, Phillip Wood, was nominated by the Alabama Information Technology Association as a Top Executive in Information Technology.

TCHA Network Information

The following information describes the network architecture at TCHA.

Backbone:
- Cisco WAN router with dual MCT1, GIG fiber, and Ethernet 10/100 connections.
- Nortel 8600 as Core migrating to dual Cisco 6513 switches. Dual Cisco 6513's routing switches as Server Farm up to GIG connectivity for servers.
- Layer 2 switching throughout.
- Stacked/Tagged Nortel 450-24T switches migrating to Cisco 3750's in user closets. Closet Based VLANS with some departmental VLANS tagged throughout multiple closets.
- 10/100Mb and limited 1000Mb to the desktop.
- 98% IP 2% IPX.
- Multiple GIG connectivity between Closets and Switches.
- Frame Relay is a 6 Meg DS3 with 15 remote ANH router/hubs connecting from 128K up to full T1.
- ABG Wireless Capability utilizing Cisco Access Points with Lightweight technology.

Connectivity to TCHA is comprised of the following choices:
- VPN access through a 12 Meg DS3 migrating to 50Meg MetroEthernet. It is protected by Cisco PIX firewall using pre-shared authentication, 3des, SHA and Diffie-Hilman Group 2. Cisco VPN Client required.
- RAS router using SecureID authentication.

Databases at TCHA:
- Oracle 9i, 8i
- SQL versions 6.5 , 7, and 2000
- Access 97 - 2003

Operating Systems:
- Servers - Win2K, Win2003, Citrix, AIX, Tru64, HPUX. Active Directory in mixed mode.
- Workstations –Win2K (sp3), XP (sp1 and sp2).

Utility Software:
- Network Associates Virus Scan Enterprise 8.0i
- Timbuktu Remote control software
- Email is Exchange 2003
- Backup Strategy Veritas Backup Exec version 10.0

External connectivity (Internet and Internet2):
- 50Meg MetroEthernet through Bellsouth for Internet
- 100 Meg Ethernet connection to UAB Campus → Internet2 access
- 100 Meg Ethernet connection to UAB Health System

TCHA Telemedicine Vision

As one of the nation's leading centers for pediatric medicine and health care, the Children's Hospital of Alabama is dedicated to the goal of making a difference in the lives of children and families. The Hospital pursues this goal not only through the practice of leading-edge medicine and the provision of outstanding health care services, but also by conducting pediatric research, and by administering or supporting more than 40 educational and child advocacy initiatives that reach children and families throughout Alabama.

As an integral part of its commitment to the health and safety of the statewide community it serves, Children's Hospital works to ensure adequate access to medical and health care services for underserved populations in both urban and rural areas. Among its 3,000-plus employees, the Hospital cultivates a passion for constant refinement, improvement, and expansion of the programs, services, and expertise it offers the community.

The burgeoning field of telemedicine offers unique and exciting opportunities to advance the mission of Children's Hospital by improving access to pediatric medical expertise. The Hospital currently is moving toward implementation of a pilot program in telemedicine, linking the Emergency Department at Children's Hospital to four hospital emergency rooms that individually and collectively serve significant rural Alabama populations. This initiative is envisioned as the first phase of a comprehensive, statewide telemedicine program that will provide pediatric consultation to every emergency room in the state, as well as expanding access to the Hospital's pediatric subspecialists.

As a future goal, TCHA will move towards providing access to pediatric specialties and services via telehealth and telemedicine initiatives that include improving

availability and access to services for dermatology,[4, 5] cardiology,[6-8] hospital care and family communication,[9-12] pathology,[13, 14] patient education,[15] child abuse,[16, 17] chronic diseases,[18, 19] school health,[20-22] home health,[3, 23] dentistry,[24] and pediatric surgical services.[25, 26]

Eventually, the infrastructure that will be laid out will be the conduit for intra-organizational healthcare information exchange (HIE), linking educational services to participating organizations. As a logical consequence of a robust HIE infrastructure, interoperability with the up and coming standards for electronic health records can be supported. One can imagine the benefits of multi-point synchronous video-conferencing and exchange of patient information in real-time without the limitation of distance and bandwidth.

Today	Near Term	Long Term
Existing Telemedicine Initiatives		
Teleradiology	Expand Services	
Telepsychiatry	Improve/Upgrade	Expand to all Rural Health Centers
Tele-education	Continue	UAB, Biomedical Research, CME
Planned Telemedicine Initiatives		
Pediatric Specialty Access	Pilot Hospitals	Expand to all Rural Hospitals
	Pediatric Emergency Medicine	Expand to all Pediatric Subspecialty, such as: • Dermatology • Cardiology • Child Abuse • Surgical Services • Others (see text)
Electronic Health Record Interoperability		RHIO, Research, Quality of Care measurement

Scope of the Problem

Infant mortality rates are often used as markers for the general well-being of society. Of the 20 counties in Alabama with double digits in infant mortality rates in 2003, 18 of those were in rural counties. In particular, infant mortality rates in the Black Belt counties and Delta region counties are higher than the state average. These areas also suffer from inadequate prenatal care than other counties. In 2004, rural physicians in Alabama have twice the number of patients compared to their urban counter parts. Fewer than 20% of the state's physicians practice in Alabama's rural areas. All but 6 of the 67 counties in Alabama are currently classified as shortage areas for primary care practitioners (family practice, internal medicine, pediatrics, and obstetrics/gynecology) who provide health care for low-income populations. The lack of medical specialties in the rural area, coupled with the higher risk for disease pose a particular risk to the vulnerable pediatric population.

The pilot phase aims to cover a broad rural-referral catchments area, which specifically includes pilot hospitals located in both the Black Belt and the Delta regions of the state. By doing so, the pilot phase will complement an existing telemedicine

project in the southern tip of the state between the University of South Alabama and D.W. McMillan Memorial Hospital in Brewton, AL.

While the *concept* of telemedicine—using audiovisual technology as a tool in diagnosis, treatment and care of sickness and injury—is not a new one, the *practice* of telemedicine is still a largely unexplored frontier. This is due to any number of issues, the most common of which have been identified in numerous studies and research projects across the United States. These general obstacles to progress in telemedicine include:

- Inadequate policies and procedures for reimbursement of hospitals and doctors that provide telemedical services;
- Legal issues such as licensure and credentialing, as well as general liability concerns;
- Technical issues ranging from unreliable image and transmission quality to the relative "user-unfriendliness" of telemedicine equipment;
- Inability of short-staffed hospitals to devote personnel, equipment and resources necessary to support and maintain telemedicine capabilities; and,
- Simple resistance to change and aversion to new technology among all segments of the health care community—hospital operators, doctors, insurance providers, and governmental agencies on both the federal and state levels.

Such obstacles notwithstanding, the experience of the forward-thinking medical community is that telemedicine works—particularly when properly applied and utilizing the best available technologies. The usefulness of telemedicine in improving patient care—in saving lives—has been demonstrated, even in the most critical situations and under the most remote circumstances.[27] In addition, telemedicine has been applied successfully to a broad variety of subspecialties, ranging from ophthalmology to dermatology to psychiatry. Perhaps most importantly, telemedicine has proved itself as a means of helping to diagnose, treat, and prevent treatable conditions to which underserved populations are especially vulnerable.

Rationale

TCHA Patient Services Catchment Area

In 2006, about 608,326 patients from Alabama were seen at TCHA's ambulatory and inpatient settings. Using the area where the counties of the pilot hospitals are centrally located, the catchment area covers up to 33% of those visits (200,663). Together with TCHA's immediate catchment area (Jefferson County and surrounding counties), the pilot phase of the ALPHA Network project will cover up to 98% or 600,961 visits for that year alone. In addition since 2006, the TCHA Emergency Department saw 67,107 patients from the surrounding counties served by the four pilot hospitals (11,896) and TCHA (55,211), this accounted for up to 94% of the patients seen since that period.

Transportation to and from urban centers from two of the pilot areas is difficult and time consuming at best. Pervasive rural poverty plays a significant role in the lack of reliable transportation. Some of the barriers have been removed by a relative new non-profit, KID ONE TRANSPORT, which transports children and their parents who lack transportation to their appointments in Birmingham. At minimum, the roundtrip commute

to the Children's Hospital of Alabama where the sub-specialty clinics are primarily located, takes a minimum of 3-5 hours. Therefore children have to miss school days and lose valuable developmental time and opportunity. Their parents oftentimes are employed in service jobs and do not have much leave time available. Therefore there is a loss of productivity and wages to keep their appointments.

In all 4 pilot counties for emergency medicine services, children comprise between 24.9 and 30 percent of the total population. The annual median household income is between $28,000 and $33,000. The percentage of families living in poverty is between 13-18%. In all four counties the percentage of women working with young children is greater than 50%.

In the next 10 years, more than half of the state's pediatricians, general and family practitioners will be reaching retirement age. In addition to a long standing shortage of pediatric sub-specialists, the pipeline to replace and retain primary care physicians in Alabama's rural communities is very limited, foreboding more pressure on rural hospital and clinic emergency services.

With more frequent reduction in reimbursement of Medicare and Medicaid, escalating labor and supply prices, and other restricting factors, the pressure on rural hospitals to provide the care needed by the community continues to escalate. Rural hospitals are one of the foundational blocks of the community in wellness and disaster. Telemedicine is one means to provide wisdom and knowledge to a committed community team caring for their neighbors, an extra set of triage eyes in a disaster, and an opportunity to eliminate unnecessary trips to the urban centers of care.

Existing Pediatric Telemedicine Efforts

Children's Hospital of Alabama has two existing telemedicine initiatives. In 2002, due to the lack of pediatric radiologists supporting the hospitals within the Birmingham area, Children's Hospital led the effort to provide 24/7 access to pediatric radiologists to 3 hospitals in the area, via Virtual Private Network and Secure Socket web-enabled access to the referring hospital's diagnostic work stations. This teleradiology initiative is growing strong, with more urban centers are participating in the near future. Due to the advancement of standard communication of radiographic images,[28] pediatric teleradiology initiatives have been slowly taking ground and implemented.[29]

In 2005, Children's Hospital piloted a Telepsychiatry initiative to a rural area in Southwest Mental Health Center in Brewton, AL as well as in Montgomery Area Mental Health Authority, Inc. in Montgomery, AL. Telepsychiatry has been known to be one of the telehealth initiatives that has been documented to be highly effective with pediatric populations.[30, 31]

Recently, in collaboration with the Pediatric Surgery Department, the Emergency Medicine division installed video cameras in the trauma room to record activities during a pediatric trauma for educational purposes as well as for subspecialty training activities. Long distance trauma education is known to reduce variations in rural trauma care. [32-34]

Expanding Access to Pediatric Subspecialty beginning with Emergency Medicine

Emergency Medicine (EM) is a field in medicine that offers a distinctive role in this healthcare evolution. Providers in this field deliver 24 hours a day – 7 days a week, non-stop service while handling patients with the highest medical acuity. The Emergency

Department (ED) often acts as a central hub in managing patients in these critical situations, interacting with the primary care physician, the nursing home, the emergency medical services (EMS), the surgeons, and other medical specialists. The American College of Emergency Physicians (ACEP)[1] reflected on the future role of EM. The ED needs to be ready to assume the role of providers that handle cases which were previously cared for in an "in-patient" setting. Not only will the ED need to stabilize highly acute medical cases but also manage more complex health problems as outpatient care has been increasingly accepted as the trend. Due to its 24-hour availability, the ED will be seeing more primary care health services especially during holidays and weekends. It will also handle more specialized care like chemotherapy, IV antibiotics, continuous cardiac monitoring, dialysis, and other advanced diagnostic workups. ACEP has outlined that EM will have to <u>be flexible and versatile as they adapt to this changing environment</u>. The ED will have to handle emergency services as well as offer primary care and specialist services, play hospitalist and community outreach roles, adapt to advances in technology, and at the same time actively participate in medical education and research. Telemedicine will play a significant role in linking outlying facilities and EMS in providing real-time consultation, thereby improving the delivery of care. Healthcare practitioners in remote areas are able to communicate in real-time consultations that can impact diagnostic sensitivity and specificity.[35] These types of teleconsultation are especially beneficial to areas where complex pediatric diseases are infrequently encountered. Infants and children seen in these areas will benefit from instant pediatric consultation, saving time and resource costs for unnecessary tertiary care transfers.[8]

The ability to adapt to all of these challenges will become the blueprint for developing the TCHA Emergency Department Telehealth services.

Emergency Medicine Department – Children's Hospital of Alabama

The Pediatric Emergency Medicine department provides a statewide and regional referral site for complex emergency problems and acute tertiary care for the state's major pediatric trauma and medical center at the Children's Hospital Emergency Department. The division provides 24-hour on-site coverage, and faculty members are specialized in pre-and in-hospital emergency care and resuscitation and trauma services. Special services include:

<u>Critical Care Transport</u>

The Children's Critical Care Transport team originated in 1983 to meet the specific needs for transporting critically ill and injured children. Since Birmingham offered such high levels of care and treatment regimens, the demand for a means of getting these patients here was on the rise as well as the concerns of transporting critically ill children. Critical Care Transport came through with the ability to take the knowledge and technology that was based here in Birmingham, and carry it out to the critically ill, while incorporating the ability to transport these patients back to Birmingham in an efficient and controlled environment.

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[1] The Future of Emergency Medicine, 1997-98 Task Force on the Future of Emergency Medicine, American College of Emergency Physicians (ACEP)

As needs have progressed, so has the Critical Care Transport team. Children's CCT Team currently offers transport of critically ill patients by the means of a specially trained group of nurses and respiratory therapists. We now provide HELICOPTER, JET and GROUND transport based on patient acuity, location and weather. All types of vehicles provide the team with special equipment designed specifically for transport allowing us to provide top of the line care to our patients

Poison Control and Injury Prevention

Accidental ingestion of prescription drugs are common in children.[36] Children's Hospital is the home of the Regional Poison Control Center. It is the region's primary source of expertise in accidental ingestions for pediatric patients.[37]

Technical infrastructure at the TCHA Emergency Department

The TCHA ED is among the few pediatric emergency departments in the country that is paperless. Clinicians in the ED use the Codonix Emergency Department Information System to triage, document, order medications and view laboratory results. Radiology images are viewed using Siemen's web-enabled radiographic image browser called Magicweb. The ED is fully automated with order entry capability as well as wired and wireless access to the network and the Internet.

Scenarios for pediatric emergency medicine telehealth services

The following are four pediatric scenarios in which telemedicine is useful in emergency situations, especially in rural areas.

1.   3 year old boy former premature baby with multiple medical problems including a VP shunt (brain fluid shunt) in place presents to a hospital 4 hours away in Boaz, AL with his mother. He seems to be fussier and has had some vomiting. A CT scan is done and shows significant hydrocephalus. The physician in the ED is concerned that the child's VP shunt is no longer working and wants the child to be seen by neurosurgery. Mom reports that the child is now better and is much less concerned.

> *If telemedicine were an option, we could compare the CT scan to older ones on our system, look at older records and discover that the patient has anencephaly- a condition with very small amounts of brain and then discuss with Neurosurgery. We could then talk with the family and view the child and observe the child closer to home, avoiding a long transport time.*

2.   4 year old girl with vomiting for several days with continued brisk urine output presents to outside hospital with abnormal breathing pattern is being seen at a hospital in Sylacauga, AL. On exam the child is found to be quite dehydrated and intravenous (IV) access was difficult to obtain. The child goes into respiratory distress while awaiting an IV.

In this scenario, our ED physicians could talk the physician in the hospital's emergency department through resuscitation of this child with DKA and get the child transferred to Children's Hospital's pediatric ICU in a timely manner.

3.   2 week old boy with respiratory distress who appears quite ill presents to a hospital in Demopolis, AL. After preliminary tests, no identifiable causes were noted on the initial exam.

In this scenario, our ED physicians could examine the child with them, talk with the family and discuss the complex differential diagnosis of infection, metabolic disorder, heart disease and other possibilities. We could also talk the physician through starting prostaglandins to open the ductus arteriosus if congenital heart disease is thought to be the cause of the illness. The transport to Children's Hospital PICU via helicopter can then be immediately initiated.

4.   9 year old girl with known seizure disorder has been having multiple seizures at home. The family administered diastat (seizure medication) at home without much improvement. The child continues to seize in a hospital in Alexander city, AL. Ativan (seizure medication) is given twice and the child's seizures stop. The child is then noted to have periods of apnea (breathing problem).

In this scenario, instead of the child being immediately intubated, we could talk the MD through using bag valve mask technique and jaw thrust maneuvers as needed to help the child breathe for a few minutes as the Ativan's effect on breathing subsided and the child began to awaken. This child then may be able to be observed in the ED or in the local hospital, avoiding a trip to Children's Hospital.

Existing pediatric telepsychiatry scenario

Dr. Tom Vaughan leads the existing telepsychiatry service at Children's Hospital. Dr. Vaughan and Dr. Marsha Raulerson, a primary care pediatrician in Brewton, AL have been working together for over 3 years to bring pediatric psychiatric care to patients in this part of rural Alabama, under the auspices of the State Mental Health Department. This scenario best describes how this current system worked for Dr. Raulerson.

"If I have a patient who needs a psychiatrist, I write up the history and brief PE and FAX or Email it to Dr Vaughan. We also ask the family to fill out a 15-page form for Southwest Alabama Mental Health and send that to Dr Vaughan. We also have a caseworker who helps the patient with the process. My secretary develops the schedule, contacts the patients, and works with the hospital to insure a smooth day on the 4th Monday of each month. Dr Vaughn, working from a studio at the Bradley Center at Children's Hospital in Birmingham, "sees" new patients for one hour and follow-up patients for 30 minutes. He also interacts with the patient, his family and sometimes a case manager or counselor. He then

emails a patient note that includes diagnosis and treatment plan. If medication is to be tried or changed, I write the prescription and the family contacts me for problems. I contact Dr Vaughan as needed by email, telephone or pager. Using this system we are now treating over 70 children with psychiatric diagnoses. Three family practice doctors from this community also have referred patients"
Marsha Raulerson, MD FAAP
Brewton, AL

Approach

Using emergency medicine as the basis for a pilot program in telemedicine is a natural decision for TCHA. As mentioned above, the emergency medicine department is the gateway to patient care in urgent settings. For example, injuries resulting from accidental trauma are by far the leading cause of death and disability among children under the age of 19. As a practical matter, telemedicine presents an opportunity to improve the quality and timeliness of care during the "golden window" immediately following an injury; it also will aid in decision-making with regard to onsite care, and in providing critical information to the Emergency Department staff at TCHA prior to the arrival of patients being transported from outlying areas. Natural disasters, bioterrorism, and disease surveillance are also logical extensions of this setting.

In addition, TCHA believes that implementation of an emergency-based telemedicine program will help fill significant gaps in pediatric-specific knowledge and experience among emergency room physicians, thereby reducing the incidence of time delay, patient discomfort, and inappropriate or ineffective care that can result from unnecessary testing. As envisioned by the Hospital, telemedicine ultimately will create efficiencies in subspecialty practice areas, eliminating or greatly reducing the need for time-consuming travel to outlying clinics by TCHA subspecialists. Finally, the presence of leading-edge telemedicine capabilities will enhance the Hospital's preparedness to respond to disaster scenarios by extending physician expertise to the pre-hospital environment at the scene of a mass-casualty event.

With all of these factors in mind, the pilot program will link the Emergency Department at TCHA to the emergency rooms at four outlying hospitals. The hospitals are:

1)   Marshall Medical Center South, in Boaz, AL
        (City population 7,411, Marshall County population 85,634);
2)   Bryan W. Whitfield Memorial Hospital, in Demopolis, AL
        (City pop. 7,540, Marengo County pop. 21, 879);
3)   Russell Hospital, in Alexander City, AL
        (City pop. 15,008, Tallapoosa County pop. 40,717)
4)   Coosa Valley Medical Center, in Sylacauga, AL
        (City pop. 12,616, Talladega County pop. 80,457).

Beyond the opportunity to achieve qualitative and quantifiable improvements in the availability and accessibility of pediatric emergency care in Alabama—and laying the groundwork for a comprehensive statewide initiative in pediatric telemedicine—it is

hoped that the Children's Hospital telemedicine pilot program will achieve four other objectives. These are:

- Providing a basis for assessing the costs, benefits, and other effects of telemedicine on pediatric medicine and health care;

- Working through the pilot program and in cooperation with other interested parties to formulate and implement the technological infrastructure necessary to make telemedicine a routine option for medical and health care uses throughout Alabama;

- Creating a framework for delivering integrated telemedicine services, including connection to informational resources, access to relevant databases and clinical information systems, video conferencing, and others to be determined based on the needs of providers in participating communities; and,

- Supporting health providers in outlying communities in the adoption of telemedicine, including working to ensure the availability of training, management strategies and technical support providers need to implement telemedicine and utilize it effectively.

ALPHA Network Pilot Hospitals

Access to Pediatric Emergency Medicine Services:

Marshal Medical Center South
2505 U.S. HIGHWAY 431, SOUTH
BOAZ, AL 35957-0000
(256) 593-8310
ADMINISTRATOR: John Anderson
Beds: 150

Bryan W. Whitfield Memorial Hospital
150 U.S. HIGHWAY 80
DEMOPOLIS, AL 36732-0000
(334) 289-4000
ADMINISTRATOR: Michael D. Marshall
Beds: 99

Russell Hospital
3316 HIGHWAY 280
ALEXANDER CITY, AL 35011-0939
(256) 329-7100
ADMINISTRATOR: Frank W. Harris (256.329.7147)
Beds: 73

Coosa Valley Medical Center

315 W Hickory St,
Sylacauga, Alabama
Phone: 256-249-5000
Number of Beds: 223
Glenn C. Sisk - Chief Executive Officer

Access to Pediatric Mental Health Services:

Southwest Alabama Mental Health Center

378 W Claiborne St.
Monroeville, AL 36460
(251) 5754203
Administrator: Candace Harden

D.W. McMillan Memorial Hospital

1301 Belleville Ave
Brewton, AL 36426-0000
(251) 867-8061
Administrator: Phillip Parker
Beds: 91

Project Technology Background

Wired and Wireless Broadband Communication

There is no question that advances in the communications industry have been revolutionary. Who thought ten years ago that we could transmit 25-terabits per second over a single optical fiber. Who thought that the time-tested 10 Mb/s Ethernet, invented by Robert Metcalf in 1973, would reach 10 Gigabit/s in 2002 and 100 Gigabit Ethernet (100 GbE) in 2006 (as demonstration)[2]. Ethernet is also capable of using several physical transports such as twisted wire-pairs, coaxial cables, optical fibers, and several wireless transports (e.g., WiFi and WiMax). There is no question that Ethernet has pushed ATM (Asynchronous Transfer Mode) out of the enterprise.

In wide-area broadband networking SONET (Synchronous Optical Networks) and ATM have been replaced by MPLS (Multi-Protocol Label Switching) a very flexible and scalable packet switching protocol that supports features typically needed by circuit-switched applications such as interactive voice and video (i.e., low delays). This is accomplished by adding short headers (labels) to data packets. The labels are used by the routers and switches of the network to prioritize the data streams. "Route Once – Switch Many" is the phrase that says it all – routing is compute intensive and often the cause of delays; switching is fast and mostly done in hardware. Interactive voice and video stream can be tagged with labels and low latency routes can be established at setup time (i.e.,

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[2] GRID Today: Networking: 100 Gigabit Ethernet Demonstrated at SC06; Nov 20, 2006:
http://www.gridtoday.com/grid/1099207.html

Route Once) and all subsequent voice and video packets are quickly switched through all the router/switches (i.e., Switch Many) between the source and destination.

MPLS is an ingenious protocol perfectly suited to voice and video conferencing over packet switched data network. It enables telemedicine to reach capabilities that were very difficult and expensive with ISDN and cumbersome and unreliable using ATM and SONET. MPLS is an IETF (Internet Engineering Task Force; RFC 3031) standard very well suited to transport Ethernet Frames but also able to transport IP Datagrams without the Ethernet overhead. Large, "IP Only" networks such as the Internet2, use this feature of MPLS. In this context, MPLS supports both IPv4 (currently the most commonly used IP version) and the next generation IPv6.

An important consideration for telemedicine is security. MPLS is well suited to create Virtual Private Networks (VPN) often used in the healthcare industry. MPLS VPNs at the ISO-OSI Layer 3 (IP Layer) is quite scalable but its biggest advantage is its support for Quality of Service (QoS). QoS is a control mechanism that allows an application program to specify a certain level of performance to a data flow and receive guarantees from the network. QoS is important when network capacity is limited, especially for real-time multimedia applications.

Complex Layer 2, Layer 3, and Layer 4 tag switching routers can control and prioritize data flow. However, the idea of adding complex flow control protocols to the TCP/IP infrastructure is not without criticism. Some people advocate just increasing bandwidth as being the least expensive alternative: "Deliver the bits, Stupid;" says David S. Isenberg[3], "the intelligence of a network should reside at the periphery, not in the network and its switches." The implication is to keep the intelligence at the edges of the network, where the users and their applications are.

A relatively young Internet protocol, the Session Initiation Protocol (SIP), plays a major role in next generation network applications. SIP, an approved Internet protocol since 1999, has assumed a major role for implementing Voice over IP (VoIP) and video conferencing in packet-switched data networks. Interactive VoIP requires short round-trip delays in order to guarantee quality voice communication. In addition, SIP is an essential protocol linking the connectionless Internet with the connection-oriented telephone network. It plays a major role in tying the Internet-based packet switching networks with the voice oriented third generation (3G) cellular networks that will also use IP packet switching.

Wireless Local Area Network (wLAN)

The wireless local area networking industry (wLAN) has had an explosive but tumultuous growth in recent years. The growth began with the standardization of the 11 Mb/s wireless Ethernet (IEEE 802.11b) in 1999, the tumultuousness came with the discovery in 2001 that the security of the Wired Equivalent Privacy (WEP) method was essentially nil. Since then the industry has regrouped and produced a solid security framework that is actually better than the current security of wired LANs.

From a corporate perspective, the wireless Ethernet (802.11x) is the dominant technology of all wireless LAN technologies. The first wLAN version, 802.11b, is obsolete but its successor, 802.11g (also known as WiFi) has more than twice the throughput (22-54 Mb/s) and an indoor range of about 150 feet. The 802.11a (54 Mb/s)

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[3] Isenberg DS, *The Dawn of the Stupid Network*, ACM netWorker, February/March 1998.

has the same data rate but less range (about 100 feet) since it operates in the 5 GHz frequency band. A new version, (802.11n), is already available in "pre-standard" products even though the standard is not yet ratified (expected in September 2008).

WiFi is a short-range broadband solution where wired solutions are not practical. The Children's Hospital Emergency Department uses WiFi to connect their tablet PCs to the CodoniX ED System. It enables nurses and physician to review and enter patient data at the point of care wherever this may be (patient room, hallway, waiting room, etc.). In the future telemedicine sessions may be established anytime from anywhere – perhaps even before the patients arrives in the ED. The latter is currently examined by Dr. Orthner's team at UAB with funding from the National Library of Medicine at NIH.

Third Generation Cellular Communication (3G)

We are at the threshold of a revolution in the wireless voice communication industry. The third generation (3G) cellular communication infrastructure will support IP packet switching and support interactive voice, data, and video services. Currently, the standard for 3G is IMT-2000 defined in the early 1990s. IMT-2000[4] uses the CDMA2000 modulation scheme.

The migration path from the current second generation (2G) to 3G depends on the technology in use by a carrier (e.g., GSM,[5] TDMA,[6] and CDMA). All three approaches are "telephone solutions," which requires that the user of a handheld device first dial to make a connection and then exchange data (just like a dial-up modem). A true Internet solution would be connectionless. Nevertheless, the vision expressed by the European UMTS Forum (Universal Mobile Telecommunication System) Forum for a seamless end-to-end inter-network roaming service is especially exciting[7] (http://www.umts-forum.org/). It would enable a user with a single wireless device to roam from a wired network, into an in-building, urban network, then into a wide area suburban network, and then into a satellite-based rural or frontier network with minimal breaks in communication.[8] Download transmission rates would automatically adjust to a rate supported by the network in use.

As part of our NIH-funded project[9], "*Applications of Advanced Network Infrastructure in Health and Disaster Management*" we established a test-bed for EMS (Emergency Medical Service). In one project we measured the end-to-end data rates for three wireless systems simulating the communication aspects of an EMS provider in the field with a his/her "Control Physician" (who is usually stationed in an Emergency Department - ED) of a hospital. The results for a stationary ambulance is listed below; we could not get reliable results for WiMAX and WiFi when the ambulance was traveling at slow speed (10 mph):

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[4] IMT-2000 – International Mobile Telecommunications in 2000

[5] GSM – Global System for Mobile Communication (see PowerPoint slides in Appendix)

[6] TDMA – Time Division Multiple Access (see PowerPoint slides in Appendix)

[7] UMTS Forum, *The Path toward UMTS – Technologies for the Information Society*, UMTS Forum Report 2, 1998.

[8] Mohr W and Konhäuser W; *Access Network Evolution Beyond third Generation Mobile Communication*, IEEE Communications Magazine, Vol. 38 No. 12, Dec 2000, pp. 122-133.

[9] N01-LM-303513; Applications of Advanced Network Infrastructure in Health and Disaster Management; PI: Helmuth F. Orthner, PhD; (http://www.nlm.nih.gov/research/siiawards.html and www.hires.uab.edu)

2.5G Cellular (Verizon CDMA2000 1x EV-DO_300 kbps
WiMAX (900 MHz)   1.5 Mb/s
WiFi (802.11g)   20 Mb/s

In summary, the emerging voice/data/video communication infrastructure is an enabler to bring specialized healthcare expertise to rural areas. Instead of transporting a patient we "transport" the clinical expert's knowledge and experience to the rural healthcare site where help is needed.

The Alabama Internet2

The Alabama Internet2, also known as the "Gulf Central GigaPop (GCG), is a small network involving about seven Alabama research and educational institutions. The University of Alabama System with its three campuses, the University of Alabama at Birmingham (UAB), the University of Alabama (UA) in Tuscaloosa, and the University of Alabama in Huntsville (UAH) are the primary users. In fact, UAB and UA are Charter Members of the Internet2 Association.

The three campuses UAH, UAB, and UA are connected via OC-3 (155 Mb/s) optical links. Several DS-3 (45 Mb/s) branches feed the A&M University and other institutes from the Huntsville node. Additional DS-3 links feed Montgomery, Tuskegee University and the University of Southern Alabama (USA) in Mobile from the UAB node in Birmingham. The UAB node is also the link to the national Internet2. Two OC-3 (311 Mb/s) connections link UAB with "Southern Crossroads (SoX)" connector at Georgia Tech in Atlanta, GA. This is essentially the entire Internet2 backbone of Alabama.

Auburn University is located close to Georgia; it has its own direct OC-3 feed from Georgia Tech in Atlanta. It is not connected to the AL Internet2 network at this time (except via Sox).

Alabama Internet2
approx. 2002

The Alabama Supercomputer Authority (ASA)[10] manages the Alabama Internet2; it is an Affiliate Member of the Internet2 Association. ASA is a state-funded corporation to operate the Alabama Supercomputer Center. It also has the mission to develop and operate the state-wide Alabama Research and Education Network (AREN). AREN provides Internet access for Alabama state government, four-year universities, two-year colleges, K-12 schools, and libraries. Legislative appropriations from the Alabama Education Trust Fund provide this access at no cost to a limited number of public schools and colleges.
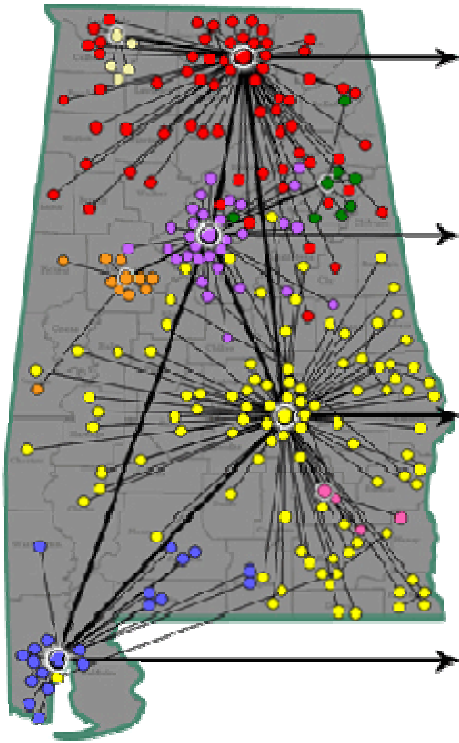
Since assuming responsibility for AREN, ASA Authority developed and implemented a technical plan that expanded Internet access to all Research Universities (6), Four-Year Universities (7), community/junior colleges (29), nearly all K-12 high schools (135), Libraries (19), and local, state, and federal organizations (25) in Alabama. Most of the access circuits are DS1 (1.5 Mb/s) connections at the moment but plans are in place to increase bandwidth substantially (see below). AREN does not support clinical care but it supports the communications infrastructure for a number of educational programs.

Alabama's ACCESS Distant Learning Program

For the past 6 months, the ACCESS project has been facilitating videoconferencing and distance learning throughout the state. ACCESS is a pilot project that is poised to become a major force in Alabama education. The Alabama Supercomputer Authority (ASA) is the networking technology partner for the ACCESS project. ASA is working to upgrade the Internet connectivity to participating schools and school systems through the Alabama Research and Education Network (AREN).

How Videoconferencing Works

Most modern videoconferencing systems utilize Internet Protocol (IP) to send video and audio over existing data networks. The H.323 standard is an umbrella standard that all vendors use to ensure compatibility of IP based videoconferencing systems. Since H.323 video calls use the same IP based network as data and standard Internet traffic, special provisioning is made so the video calls have prioritized use of the network infrastructure. This prioritization is accomplished through the use of Quality of Service (QoS) guarantees. AREN has been QoS capable for several years and provides an ideal statewide infrastructure for the transport of integrated voice, video, and data traffic.

ASA is Increasing Bandwidth

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[10] Alabama Supercomputer Authority (ASA): www.asc.edu

As the networking technology partner for ACCESS, ASA is provisioning a minimum connectivity of 10Mbps from each school system to AREN (and the Internet). In addition to the expanded bandwidth from each school system to the state network, ASA is provisioning 10Mbps from each participating high school to the corresponding school system core, in the cases where current connectivity is less than 10Mbps. These enhanced connections will not only benefit the ACCESS project, but will be used to provide increased Internet access bandwidth to each school system.

Health Professional Education for Telemedicine

Bandwidth and technology alone will not enable a successful and sustaining telemedicine operation. The literature is full of examples of failed telemedicine experiments. All too often telemedicine projects are abandoned when project funding ends. To assure success, trained professionals (nurses, physician assistants, EMS providers, etc.) need to be available in rural areas. The School of Health Professions at UAB is addressing this manpower problem. In fact, several degree programs are taught on-line providing intensive exposure to online activities to students living in rural areas.

For example, the Department of Critical Care in the School of Health Professions at UAB uses video conferencing as part of their on-line curriculum. This includes the following health professions: Nurse Anesthesia, Respiratory Therapy, and Surgical Physician Assistant (http://main.uab.edu/shrp/default.aspx?pid=77126). The following Video Conferencing Sites are used by the Department of Critical Car for their Telehealth Education Program:

- Dothan, Alabama – Wallace State Community College
  Site Info - http://138.26.15.204/vianet-al.net/newIITS/bycity-details.asp?loc=WSCC1
- Huntsville, Alabama – University of AL at Huntsville, Technology Gall
  Site Info - http://138.26.15.204/vianet-al.net/newIITS/bycity-details.asp?loc=UAH2
- Gadsden, Alabama – University of AL at Gadsden
  Site Info - http://138.26.15.204/vianet-al.net/newIITS/bycity-details.asp?loc=UAG1
- Montgomery, Alabama – University of AL at Montgomery
  Site Info - http://138.26.15.204/vianet-al.net/newIITS/bycity-details.asp?loc=UAG1
- Tuscaloosa, Alabama – University of AL Continuing Studies
  Site Info - http://138.26.15.204/vianet-al.net/newIITS/bycity-details.asp?loc=UA1
- Mobile, Alabama – Mobile Infirmary
  Site Info – http://www.mimc.com/

The Department of Health Services Administration has five programs, both B.S. Programs are taught online and two M.S. Program are currently using a "blended" approach but they will be taught online by academic year 2008/09:

- B. S. Science in Health Sciences (BS) (online)
- B.S. Health Information Management (HIM) (online)

- [M.S. Health Informatics (MSHI)](#) (blended)
- [M.S. Health Administration – Executive (MSHA)](#) (blended)

To improve healthcare in rural areas using telemedicine requires trained professional staff to interact with patients and family members and to operate the telemedicine equipment and associated networking and computing equipment. The School of Health Professions is in the unique position to provide this essential manpower.

The Next generation Internet2

The Internet2 Association is in the processes to upgrade its fiber-optic network to 10 GbE and possible even to 100 BbE. One node, a Level 3 Regeneration Node, is in Birmingham. This node may serve as our new access point for Alabama once available.

Work Plan and Timeline

A team of experienced and dedicated physicians, medical informatics experts, administrators, and support staff health IT from TCHA and the rural facilities will be a part of the ALPHA Network steering committee.

The Pilot project will be led by the following leadership team: Dr. Feliciano Yu (Principal Investigator) is both a pediatrician and a medical informaticist at TCHA. His expertise and research interest is on designing clinical information systems that improve quality of care. Dr. Helmuth Orthner (Co-PI) is Professor at the University of Alabama at Birmingham, Health Informatics Department. His expertise is on next generation networks, wireless communication, and very high-speed communication systems. His current interests are focused on the out-of-hospital emergency medicine information infrastructure. Dr. Peter Glaeser is the director of the Children's Hospital Emergency Medicine Division. He is a board-certified pediatric emergency medicine specialist. Dr. Jennifer McCain is also a pediatric emergency medicine physician at Children's Hospital. Her main interest is promoting the use of telemedicine for use in emergency medicine settings. Dr. Tom Vaughan, is a pediatric psychiatrist, and he leads the existing telepsychiatry effort between TCHA and two mental health centers in the region.

Governance Structure

To ensure proper coordination of the project during the pilot phase, a steering committee will be immediately formed by the leadership team. This committee will provide guidance and ensure proper preparation, planning, management, and execution of the project. The ALPHA Network Steering Committee is composed of the key stakeholders and decision makers responsible for the preparation of this grant proposal. Dr. Feliciano Yu, the Principal Investigator and Dr. Helmuth Othner, the co-principal investigator, will initially lead the committee as co-chairs for the duration of the project. However, the execution and the governance structure will be operationalized by three

distinct leadership councils, the Clinical, Management, and Technical Councils (see Figure below).

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                        ┌─────────────────────┐
                        │   ALPHA Network     │
                        │  Steering Committee │
                        └─────────────────────┘
                                  │
       ┌──────────────────────────┼──────────────────────────┐
┌──────────────┐          ┌──────────────┐          ┌──────────────┐
│  Technical   │          │  Management  │          │   Clinical   │
│   Council    │          │   Council    │          │   Council    │
└──────────────┘          └──────────────┘          └──────────────┘
```

Helmuth Orthner, PhD (Co-PI)   Suzanne Respess   Feliciano Yu, MD, MS (PI)
      Mike McDevitt   Glenn Sisk   Peter Glaeser, MD
      Frank Harris   Candace Harden   Tom Vaughan, MD
      Phillip Wood   John Anderson   Jennifer McCain, MD
      Kelvin Knight   Michael Marshall   Marsha Raulerson, MD
      Pam Atkins   Robert Cloud   Hoyt Childs, MD
      Justin Fincher   Debbie Standford, MD
      Bill Herrin   Jim Dearth, MD
      Austin Mann

ALPHA Network Steering Committee

The ALPHA Network Steering Committee will work as a team and promote cross-pollination of ideas during the duration of the project. It is important that communication within the committee is seamless and transparent. The execution of the project, however, will be handled by the respective councils detailed in the next section. The table below itemizes the members of the ALPHA Network Steering Committee. The list also details their qualifications and positions in their respective organizations.

Clinical Council

Composed of physicians, the Clinical Council will ensure that the process and procedures are appropriate for the end-users of the system. This council will be responsible for determining the functional and informational requirements of the system. This council will also be responsible for defining the clinical measures of success of the project.

Management Council

The Management Council is mostly composed of healthcare administrators. The expertise and real-world experience of the members of this council will ensure that the processes and procedures are achievable and practical in the clinical care setting and healthcare environment. This council will ensure that funding mechanisms, legal protection of privacy and confidentiality, and other important issues are defined and

addressed during the project. This council will be responsible for developing cost and administrative success measures.

ALPHA Network Steering Committee	Title	Organization
Feliciano Yu, MD, MS	Medical Informaticist, PI	TCHA
Helmuth Orthner, PhD	Professor, Co - PI	UAB Health Informatics Department
Peter Glaeser, MD	Director, Emergency Medicine Division	TCHA
Tom Vaughan, MD	Director, Telepsychiatry Program	TCHA
Jennifer McCain, MD	Pediatric Emergency Medicine	TCHA
Suzanne Respess	Directory, Government Relations	TCHA
Mike McDevitt	Chief Information Officer	TCHA
Marsha Raulerson, MD	Pediatrician	D.W. McMillan Memorial Hosp.
Frank Harris	Administrator	Russell Hospital
Glenn Sisk	Chief Executive Officer	Coosa Valley Medical Center
Candace Harden	Director	Southwest Alabama Mental Health Center
John Anderson	Administrator	Marshall Medical Center South
Michael Marshall	Administrator	Bryan Whitfield Medical Center
Phillip Wood	Manager, Network Services	TCHA
Kelvin Knight	Director, Biomedical Services	TCHA
Pam Atkins	Director, Information Technology	TCHA
Justin Fincher	Audio/Visual Specialist	TCHA
Bill Herrin	Director, Information Technology	Marshall Medical Center South
Austin Mann	Network Specialist	Marshall Medical Center South
Hoyt Childs, MD	Director, Emergency Medicine Division	Marshall Medical Center South
Debbie Stanford, MD	Director, Emergency Medicine Division	Coosa Valley Medical Center
Robert Cloud	Executive Director	UAB Infrastructure Services
Jim Dearth, MD	CEO	TCHA

Technical Council

The Technical Council is composed of information technology experts from participating hospitals and healthcare institutions. This council will ensure that the technical specifications set forth by the Clinical Council and the Management Council are translated into the system requirements. The council will also be responsible for designing downtime and fail-over mechanisms to ensure service continuity. More

importantly, this council will make certain that the clinical functional requirements of the application run flawlessly meeting the predetermined acceptable quality of service.

ALPHA Network Project Timeline

A prerequisite to achieving the goals and objectives for this pilot project is the laying of connectivity infrastructure. Therefore, meeting the specific objectives is vital to meeting our goals. A detailed description of the activities to be accomplished over the grant period is found in the table below.

Timeline	Description
1. Project Initiation	
a. Convene Steering Committee	The most important step; engage and gather commitment/active participation from key stakeholders; Steering committee drives the activities forward, provides leadership and management oversight
b. Identify Key Resources	Determine the appropriate personnel and technical expertise necessary to make the project succeed; allocate as needed; partnerships with pilot sites and other key stakeholders firmed up at this time; assign teams for project deployment;
i. Space	Determine and allocate space for program for each site
ii. Equipment	Determine the most appropriate equipment (demos, site visits, etc)
c. Determine Methods for Deployment, Testing and Evaluation	Define method and measures for success; detail deployment strategy; define evaluation strategies for software, hardware, processes; identify downtime and fail-over mechanisms
d. Determine Strategy for Sustainability	Determine strategies for scalability and sustainability of the project after funding; assess possible funding sources and explore pertinent solutions; explore reimbursement mechanisms for teleconsultation services
2. Initiate Key Technology Partners	Identify and engage human resources; assign tasks; provide appropriate support (salary, sheltered time) for technical assistance and teams
a. Equipment Acquisition	Select and purchase equipment (hardware/software);
b. Contract	Licensing, agreements, other contractual activities must be approved by this time.
c. Shipment	Deliver equipment to TCHA
d. Distribution to participants	Deliver equipment to sites
e. Installation	Installation of lines must be performed at this time, if telemedicine equipment was purchased, it will be installed at this time as well
3. Developing of Teleconsultation Format	This stage defines the format and processes required for teleconsultation activities; leverage existing processes and revise as needed

a. Software Application	Run software and assess functionality
b. Policy and Procedures	Design and prepare policy and procedures for teleconsultation; ensure HIPAA privacy and confidentiality for patients; follow reimbursement mechanisms if available; ensure consent and patient safety agreements in place
c. End-user workflow gap analysis	Assess workflow gaps prior to deployment; change faulty processes as needed prior to implementation; detail downtime procedures
4. Functional Testing of Telemedicine Activities	Go-live for pilot sites; concurrent testing and support available 24/7 per predetermined process
a. Software Application	Concurrent testing and support 24/7
b. Hardware	Concurrent testing and support 24/7
c. Process	Concurrent testing and support 24/7; assessment of downtime and fail-over mechanisms and processes
5. Evaluation (cost, process, outcomes)	Evaluate processes, outcomes, cost of services; utilize predetermined methods for assessment time-motion, survey, observation, etc)
a. End-user feedback	Pay particular attention to the users of the system; ensure that system is easy to use; re-design faulty processes as needed
b. Monitoring Quality of Service	Assess level of service against predetermined criteria; software, equipment, connections; assess bandwidth and connection speed; quality of video/audio
c. Maintenance	Assess issues related to maintenance; determine adequacy of resources and ability to respond to user's needs
d. End of project Assessment	Convene steering committee for end of project evaluation; detail deliverables and performance on success measures; begin to lay out steps for future expansion and sustainability
6. Future Expansion and Sustainability	Steering committee determines the next steps based on assessment of pilot project; future enhancements or improvements may be defined at this stage; overwhelming success will necessitate that the project will move to next step; prepare implementation guides and talking points for project overview; present and showcase project experience; invite feedback and suggestions from stakeholders.
a. Services	Determine and prioritize services to be deployed and offered
b. Sites	Collaborate with interested organizations for harmonization of efforts;

Project Timeline and Team Responsibility:

1.   Project Initiation

        The overall project is directed by Dr. Yu who is also the Chair of the Steering Committee. Steering Committee members represent the major stakeholders from TCHA, UAB, ASA, and representatives of participating sites. The Steering Committee can appoint standing and ad-hoc subcommittees. There are two standing subcommittee: Technical and Clinical. The Technical Subcommittee focuses on all technical issues (communication, workstation, database backup, technical security, telemedicine equipment, etc.). The Clinical Subcommittee focuses on all clinical and regulatory issues (pediatrics subspecialties, electronic health records, patient consent, clinical quality monitoring & control, reimbursement issues, etc.). Initially the Steering Committee will meet monthly, later quarterly.

        Recommendations for suitable space and appropriate telemedicine equipment will be gathered from other telemedicine sites, experts, vendors sites, etc. Telecommunication equipment selection will be coordinated with the ASA, UAB and TCHA IT Departments, and their counterparts in participating hospitals and clinics.

2.   Initiate Key Technology Partners

        Alabama Supercomputer Authority (ASA) is a key technology partner since they will manage the telecommunication infrastructure in conjunction with the service providers (e.g., BellSouth now AT&T, IT^DeltaComm, …). The selection, purchasing, configuration, testing, operation and maintenance of all ALPHA networking and communication equipment will be subcontracted to ASA via the TCHA IT Department.

        Initially, user authentication and authorization will be done centrally but an organization will need to be selected. IITS (Intercampus Interactive Telecommunications System), a University of Alabama System's organization, manages all the telehealth videoconferencing session of AREN is one organization but the IT Departments of TCHA, or UAB can also be considered. TCHA IT is familiar with the HIPAA regulations that must be complied with.

        E-mail service, one or more Web sites, and a Newsletter must be established to facilitate communication. Again, the TCHA e-mail and Webservers are logical choices considering the community of users are pediatricians, children and their families.

        Telemedicine equipment and videoconferencing equipment will need to be selected and tested before it is distributed to the partner sites. Dr. Orthner's Health Informatics Research (HIRES) Lab is available for this purpose.

3.   Developing of Format for Teleconsultation

        Policies and procedures need to be developed. Typically, other successful telemedicine programs have developed these already and are available for adaption to our environment. For example, the Utah Telehealth Network's policy and procedures manual is online and available to download

(www.utahtelehealth.net/policies). Clinical specialty protocols are available on the Web but they need to be adapted for pediatric use.

4.   Functional Testing of Telemedicine Activities
        Most telemedicine systems come with basic software functionality. However, this functionality is most likely tailored for interacting with adult patients not pediatric patients. We realize and expect to adapt application software. TCHA IT staff has great experience with adapting vendor supplied clinical systems to the pediatrics environment. Several IT staff members at TCHA are HI Graduates (including Dr. Yu); it is a great opportunity for collaboration with the Health Informatics (HI) Program at UAB.

5.   Evaluation
        Clinical processes are often difficult to evaluate since the process of evaluation may interfere with clinical care. We plan to address the evaluation topic early so that evaluation is 'built-in" not "added-on." This has a potentially significant impact on avoiding and controlling medical errors.
        In telemedicine, the communications infrastructure is has special importance since traditional data networks do not have the Quality of Service needed for interactive voice and video. We will be monitoring the round-trip delays during select video-conferencing sessions that will allow us to collect data, which we can feed to models for predicting potential problems. We hope this will eventually lead to a more robust telemedicine infrastructure.

6.   Future Expansion and Sustainability
        Our goal is to establish a track record within one year that is so good that others will want to join ALPHA Network. While we focus on Pediatric Emergency Medicine initially, we hope to demonstrate not just feasibility but an actual improvement in morbidity and mortality of our children and pursuing the expansion to making other pediatric specialties accessible to the rural healthcare community.

Timeline Table

Timeline	Year 1 Q1	Q2	Q3	Q4	Year 2 Q1	Q2	Q3	Q4
1. Project Initiation								
a. Convene Steering Committee	X	X	X	X	X	X	X	X
b. Identify Key Resources	X							
iii. Space	X							
iv. Equipment	X	X						
c. Determine Methods for Deployment, Testing and Evaluation				X	X			
d. Determine Strategy for Sustainability				X	X	X		

2. Initiate Key Technology Partners	**X**			**X**				
a. Equipment Acquisition	**X**			**X**				
b. Contract	**X**			**X**				
c. Shipment	**X**	**X**		**X**	**X**			
d. Distribution to participants	**X**	**X**		**X**	**X**			
e. Installation	**X**	**X**		**X**	**X**			
3. Developing of format for Teleconsultation								
a. Software Application		**X**	**X**	**X**	**X**	**X**	**X**	
b. Policy and Procedures		**X**	**X**	**X**	**X**	**X**		
c. End-user workflow gap analysis			**X**	**X**	**X**	**X**	**X**	
4. Functional Testing of Telemedicine Activities								
a. Software Application	**X**	**X**	**X**	**X**	**X**	**X**	**X**	**X**
b. Hardware	**X**	**X**						
c. Process	**X**	**X**	**X**	**X**	**X**	**X**	**X**	**X**
5. Evaluation (cost, process, outcomes)								
a. End-user feedback	**X**	**X**	**X**	**X**	**X**	**X**	**X**	**X**
b. Monitoring Quality of Service	**X**	**X**	**X**	**X**	**X**	**X**	**X**	**X**
c. Maintenance	**X**	**X**	**X**	**X**	**X**	**X**	**X**	**X**
d. End of project Assessment				**X**			**X**	**X**
6. Future Expansion and Sustainability								
a. Services						**X**	**X**	**X**
b. Sites						**X**	**X**	**X**

Sustainability

The key step to ensuring sustainability planning is the formation of the ALPHA Network steering committee at the start of the project. This committee will provide direction and leadership for implementing sustainability-planning activities and ensuring that key stakeholders remain involved and supportive of the project beyond implementation. The committee will also coordinate planning activities, collect and analyze information, develop sustainability models, and execute the resulting sustainability plan.

For example, to ensure sustainability of the project, TCHA will leverage the experience from existing telemedicine efforts. Reimbursement for services is a major challenge to offering telemedicine services. Fortunately, progress is noted in both federal and private payer perspective. [38] For example, our telepsychiatryprogarms is currently being reimbursed through Medicaid. Following similar process, we will move to lead the way for developing reimbursement methods for various telemedicine initiatives particularly to those in medically underserved areas. Future funding opportunities will also be explored, as part of the sustainability plans of the ALPHA Network steering Committee (See Table below)

Activities that may be used as a source of funding for future scalability and sustainability
Government funding/support
Facility or partner organization operating funds
Other grant funding
Alternative funding/payment for en d-users
Community or charitable donations
Private/Public partnerships
In-Kind contributions
Network membership fees
Third-party fees for network use
Subsidization from other revenue generating projects or initiatives
Hardware or software commercialization and sales (unique products developed for project)

In addition, the project will continue to explore opportunities for telehealth activities. As part of its forward looking health information technology vision, TCHA is determined to promote the use of telemedicine as one of its health IT goals. Its Information Technology division, together with key stakeholders, will be responsible for managing the project, support for personnel and equipment maintenance and upgrade. Currently, the telemedicine equipment are managed and maintained by the TCHA Biomedical Division (led by Kelvin Knight). The network and computer hardware needs are being managed and maintained by the TCHA Information Technology division, led by Pam Atkins (Director, TCHA IT Division).

Lastly, by leveraging the existing partnership within the community and the region, and by strengthening the ties to pilot hospitals during the project, the initiative will ensure that participation to future ventures and collaboration will take place.

Project Success Evaluation Plan

The program valuation will be performed using a two-pronged approach using the variables in the Table below. 1) Using the goals and specific objectives as a guideline, quantifiable measures will be used to calculate the output of the project. 2) In addition, the project will focus the evaluation to address issues that can be beyond the simple feasibility of this project. In order to provide information that can be utilized for future telemedicine projects, the evaluators seek to measure clinical outcomes, track expenses to analyze the cost effectiveness of this service, and measure procedures and resources involved in establishing and delivering a full continuum of services for pediatric patients and rural healthcare institutions.

Success factors	Measures of quality
Bandwidth	Access, connection time, upload-download speed
Hardware	Access time; reliability (downtime, availability)
Software	Video, audio quality

Cost	Cost-effectiveness, cost-benefit
Process	Provisioning, efficiency
Security	Privacy, confidentiality
End-user	Ease of use, provider experience
Outcomes	patient satisfaction, end-user satisfaction, number of services and transactions, response times and timeliness of care

Measures will be collected through time-motion studies, interviews and surveys, real-time and retrospective audits of the application and equipment, and through retrospective review of administrative/clinical patient information or medical records. Specific quantifiable measures may include:

Cost:
- Travel costs savings for healthcare professionals
- Saved value of staff time
- Reduced FTE requirements
- Reduced bed stays
- Reduced costs associated with earlier patient repatriation
- Other administrative savings
- Additional indirect revenues retained in facility and community

Outcomes:
- Decreased hospitalizations related to unnecessary transfers
- Decreased emergency room visits
- Increased access to a pediatric emergency medicine and psychiatric services
- Enhanced quality of life for patients avoiding unnecessary transport
- Improved patient satisfaction
- Improved provider satisfaction

Sustainability questions:
- Is access to services quantitatively impacted and what are the outcomes?
- What is the average cost and savings associated with the creation of the pilot ALPHA Network
- What are the optimal delivery procedures for this innovation and how does this service impact patient and provider satisfaction?
- What range of clinical services are requested via teleconsultation?
- Do pilot unites access more services due to the ALPHA Network?
- Are there variations for outcomes for patients receiving telehealth services?
- What is the average cost to provide telehealth services for the pilot project?
- What potential cost savings are there for the healthcare system and the patients?
- What procedures/protocols are necessary to provide network telehealth services to rural areas?
- Are patients and providers satisfied with the use of network telehealth solution?

Budget

Communication Expenses

Location	Monthly Charges					Non-recurring Expenses		
	Local Access	**Long**	**ASA**	UAB IT	Hardware	**AT&T**	Cisco	ASA
	10M	**Distance**	**Support**	Support	Mainten.	**TCHA**	Firewall	Install
D. W. MCMILLAN MEMORIAL HOSPITAL	$1,800		$300	$250	$105	$2,000	$7,000	$1,000
SOUTHWEST ALABAMA MENTAL HEALTH CENTER	$1,800		$300	$250	$105	$2,000	$7,000	$1,000
COOSA VALLEY MEDICAL CENTER	$1,800	$970	$300	$250	$105	$2,000	$7,000	$1,000
RUSSELL HOSPITAL	$1,800	$970	$300	$250	$105	$2,000	$7,000	$1,000
MARSHALL MEDICAL CENTER SOUTH	$1,800	$370	$300	$250	$105	$2,000	$7,000	$1,000
BRYAN W. WHITFIELD MEMORIAL HOSPITAL	$1,800		$300	$250	$105	$2,000	$7,000	$1,000
THE CHILDRENS HOSPITAL OF ALABAMA						$1,000		
	$10,800	**$2,310**	**$1,800**	**$1,500**	**$630**	**$13,000**	**$42,000**	**$6,000**

Summary Budget Table

Summary of Budget for ALPHA Network Pilot Project		
Monthly Charges	Communication	$17,040
Yearly (12 months)	Communication	$204,480
Project duration (24 months)	Communication	**$408,960**
Non-recurring (Firewall Install & Config)	Equipment	$48,000
	AT&T Installation	$12,000
	TCHA Upgrade	$1,000
	Internet2 Fee	$25,000
Total Non-recurring		**$86,000**
Year 1 Total Cost		$290,480
Year 2 Total Cost		$204,480
Total Cost for entire Project Period		**$494,960**

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Attachments

Collaborative agencies' names and addresses

Marshal Medical Center South

2505 U.S. HIGHWAY 431, SOUTH
BOAZ, AL 35957-0000

Marshall Medical Centers South is a 150-bed acute care facility located in Marshall County, Alabama, equidistant between the cities of Boaz and Albertville. The facility is voluntarily Accredited by the Joint Commission on the Accreditation of Healthcare Organizations.

Marshall County Hopsital opened in 1964 and currently hosts 25 acute care beds with 25 physicians providing medical expertise.   Approximately 200 employees staff the hospital, long term care facility, and ambulance service.   The emergency room is physician staffed 24 hours per day, 7 days per week.   In addition to normal acute care services, Marshall County Hospital is equipped to offer rehabilitation, radiology, and outpatient services.

The hospital primarily serves residents of Marshall and DeKalb counties.   The population is approximately 151,716 with one quarter of the total under age 18 years of age.   The area is primarily agricultural, poultry houses, and home to many lakes and recreational boaters.   It has been home to legal and seasonal migrant workers for many decades.   With the increase in poultry farms, the number of immigrant workers has continued to grow at a faster rate than the rest of the state.   With the growth in immigrants, comes an accompanying growth in children.

The hospital works and partners well within the community to provide indigent care, community health education programs, and care to residents of all ages.

Services and features at MMC-South include a Cancer Care Center (radiation therapy and chemotherapy), a comprehensive diagnostic imaging department with MRI, a 17-bed Emergency Department, a 17-bed Day Surgery with both GI and Cysto labs, an Obstetrical Department with family centered birthing suites and a 12-bed nursery, an Occupational Medicine program with six exam rooms, a six-bed Special Care Unit (combination cardiac care and intensive care), and a 21,000-square-foot outpatient physical therapy and fitness center.

The medical staff of MMC-South consists of nearly 70 active staff physicians and a host of courtesy and consulting staff. Specialists range from family and internal medicine to general surgeons, neurologists, gastroenterologists, plastic & reconstructive surgeons and more. Many of these specialists have offices right here on the MMC-South campus.

The Emergency Department is staffed 24 hours a day, seven days a week. The department see an average of 35,000 emergency patients each year. MMC-South is a certified Trauma II Emergency facility and is supported by 4 emergency helicopter transport services.

Bryan W. Whitfield Memorial Hospital

150 U.S. HIGHWAY 80, DEMOPOLIS, AL 36732-0000

Founded in 1953, Bryan Whitfield Memorial Hospital began as a 29 bed hospital and now boasts 99 beds operating under a unified health system which includes home care, advanced life support ambulance services, maternity care, and community health education services.   The hospital and sister agencies serve residents of Marengo, Sumter, Perry, and Hale counties.   The four county area is predominantly rural, timber and agricultural land with many two lane roads.   The Black Warrior River runs through Demopolis and is used for barges and recreational boating. The total population of the four county area is greater than 66,000, with children under age 18 comprising 16,000 of the total.

The four counties comprise one of the poorest parts of the state and nation, referred to as the Black Belt.   Historically, it used to be one of the most productive regions of the nation for cotton and other agricultural products.   Governor Bob Riley and other state leaders named a Black Belt Action Commission two and half years ago to develop a plan to improve economic and infrastructure development, health care services, and education systems.   The Bryan Whitfield Memorial Hospital Chief Executive Officer, Mike Marshall, has been actively involved in the Commission and project development.

Russell Hospital

3316 HIGHWAY 280, ALEXANDER CITY, AL 35011-0939

Russell Medical Center located in Alexander City, Alabama and near Lake Martin one of the largest man made lakes in Alabama, has a long history of community and public/private partnerships.   Tallapoosa County, Russell Medical Center's residence, is home to more than 40,000 people on a regular basis, with another 5,000 joining the community on the weekend at lake houses and as recreational boaters.   One quarter of the county's population is comprised of children under 18 years of age.   One junior college is located nearby, with Auburn University just an hour further south on heavily traveled U.S. Highway 280. Alexander City has largely been a textile mill town and until recently was headquarters of the Russell Mills, producers of athletic clothing and uniforms.   As the textile mills moved out of the United States, the community has diversified.

Russell Medical Center has a long history of partnerships locally and across the state.   Mr. Frank Harris, President and CEO of Russell Medical Center, has served as the Alabama Hospital Association's Chairman, currently serves on the Alabama Certificate of Need Board, and has served on many local, regional, and state rural health related committees and commissions.   The hospital has continuously expanded and changed to meet the needs of the citizens in a changing community.

Coosa Valley Medical Center

315 W Hickory St, Sylacauga, Alabama

Coosa Valley Medical Center is more than 60 years old and serves the patients in 5 rural counties with busy lakes and rivers utilized by weekend recreationists.   The six counties largely served include Clay, Coosa, Chilton, Shelby, St Clair, and the home county, Talladega.   In total there are more than 375,000 residents, including approximately 100,000 children under age 18. On Sunday, the hospital opened its doors to a new $28 million expansion with a new ICU, women's center, and emergency department.   It is strongly supported by residents of the immediate community and those beyond.   The Coosa Valley Medical Center is viewed as a complimentary team member to the surrounding counties' smaller health care facilities.

The medical center is located approximately one hour south of Birmingham, but the highly traveled highway between the two cities is often congested making the trip much longer.   Many of the residents work near or in the Birmingham area.   They recently added a second pediatrician to the community medical staff.

The medical center leadership has been strongly connected to the community for many years in partnerships to fund a school health nurse, reduce infant mortality, supporting a mental health-counseling program in the schools, and provide indigent and uncompensated care.

Letters of agreement or memorandum of understanding from collaborative partners

Marshal Medical Center South

2505 U.S. HIGHWAY 431, SOUTH
BOAZ, AL 35957-0000

Bryan W. Whitfield Memorial Hospital

150 U.S. HIGHWAY 80, DEMOPOLIS, AL 36732-0000

Tombigbee Healthcare Authority

May 7, 2007

105 Highway 80 East
P.O. Box 890
Demopolis, AL 36732

Phone: 334-289-4000
Fax: 334-287-2594
Email: info@bwwmh.com

Dr. Jim Dearth
Chief Executive Officer
Children's Health System
1600 Seventh Avenue South
Birmingham, AL 35233

REGARDING: Letter of Support

Dear Dr. Dearth:

I am extremely excited to be able to write this letter of support for Children's Health System in order that we may be able to participate in the Rural Health Care Pilot Program.

As you may be aware Bryan W. Whitfield Memorial Hospital is located in Marengo County, Demopolis, Alabama and represents the only hospital in a 50 mile radius that provides pediatric services. As a result many of our pediatric patients have to travel in order to access pediatric specialists and sub specialists for their treatment. This presents a problem for many of our constituents as they lack access to reliable transportation and as a result often forego further treatment for their problems. Further complicating our situation is our only pediatrician is over 70 years old and is hoping to retire soon which will leave us without a Board certified pediatric physician.

In addition, in order for us to provide continued training for our clinical staff as well as EMS staff we have to incur additional costs in order to be able to schedule said staff time away from our hospital.

For all of the above reasons we are happy to be able to lend our support and cooperation to this project. Please feel free to call me if you have any questions or if you would like to discuss this matter further.

Very Truly Yours,

Mike Marshall
CEO/Administrator

MDM/dsg

Russell Hospital

3316 HIGHWAY 280,
ALEXANDER CITY, AL 35011-0939

Russell
Medical Center

Frank W. Harris
President & CEO

May 7, 2007

Dr. Jim Dearth
Chief Executive Officer
Children's Health System
1600 Seventh Avenue South
Birmingham, Alabama 35233

Re: Rural Health Care Pilot Program

Dear Jim:

Thank you for inviting Russell Medical Center to be a part of Children's Hospital of Alabama's initiative to improve the care of pediatric patients in the non-urban areas of Alabama. This pilot program will provide the emergency departments of our rural facilities the direct physician contact that is presently lacking in the system, ultimately affecting the well-being of every citizen in our predominantly rural state.

Although Russell Medical Center provides twenty-four hour, in-house emergency coverage, there are numerous instances when the services of the skilled pediatric physicians of Children's Hospital are needed without delay. Presently, this direct contact may take up to several hours, necessitating the provision of specialty pediatric services and treatment by emergency physicians more accustomed to adult emergencies. With the majority of pediatric specialists located primarily in urban areas and the impending retirement of approximately 50% of the non-urban pediatricians within the next decade, it is imperative that pediatric healthcare turn to telemedicine and telehealth alternatives to meet this crisis. These factors, combined with the economic obstacles facing many of our poorer patients, provide a bleak future for our children unless initiatives such as this pilot program are developed and implemented.

Russell Medical Center prides itself on being innovative and bringing the highest level of healthcare to our constituents and we committed to being an active participant in this program when it is implemented. You and your staff are to be commended for leading this effort and we will be honored to support you in every facet of this endeavor.
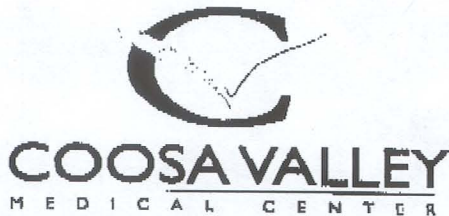
Sincerely,

Frank W. Harris
President & CEO

Cc: Suzanne Respess

I:\Grants\Rural Health Care Pilot.doc

Coosa Valley Medical Center

315 W Hickory St, Sylacauga, Alabama

COOSA VALLEY
MEDICAL CENTER

Glenn C. Sisk
Chief Executive Officer

May 7, 2007

Dr. Jim Dearth
Chief Executive Officer
Children's Health System
1600 Seventh Avenue South
Birmingham, Alabama 35233
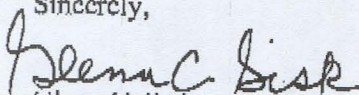
VIA Facsimile   205.939.5177

Dear Dr. Dearth:

RE: Rural Health Care Pilot Program

Coosa Valley Medical Center is pleased to provide its support to The Children's Hospital of Alabama for purposes of obtaining a grant for the Rural Health Care Pilot Program. Coosa Valley Medical Center is located in Sylacauga, Alabama, approximately 45 miles southwest of Birmingham, Alabama. Transportation to Birmingham is often hampered by extremely congested traffic conditions. Most areas in the State of Alabama are severely limited in their ability to transport patients to Birmingham because of distance and traffic patterns. The issue is compounded when dealing with Pediatric patients because of the limited number (one each in Birmingham and Mobile) of licensed pediatric hospitals in the State. It is not uncommon for patients to have to travel two hours or more to receive care for their children. Alabama also has a large working poor population who lack reliable transportation to commute long distances on a regular basis to urban areas for medical care.

Currently consults occur via telephone and often are referred because the physician does not have a visual of the patient. Connecting the State's only pediatric trauma center and comprehensive pediatric emergency room staff with rural hospital partners will offer Alabama's pediatric patients earlier diagnosis, appropriate and timely treatment in the golden hour following an injury, and reduce some pressure on a very busy emergency room. In addition, the rural emergency room team has the ability to have several extra sets of eyes and knowledge to assist in triaging in case of a natural or manmade disaster, such as a tornado.

Not unlike other hospitals across the nation, Alabama has neither enough pediatricians nor pediatric sub-specialists. At this time, pediatric sub-specialists are concentrated in the urban areas due to the volume required for the training, practice and research of the specialty. With at least 50% of the pediatricians and family practitioners reaching retirement age in the next decade, the rural and inner city portions of the state will experience greater stress on medical resources. We are fortunate to be able to utilize the telephone support of The Children's Hospital, but with video support there is no question better information for treatment would be available more timely.

Sincerely,

Glenn C. Sisk

Resumes and/or position descriptions of key personnel

Feliciano Yu, MD MSHI MSPH

Dr. Feliciano Yu is a pediatrician with a clinical informatics background. After completing his NRSA postdoctoral fellowship with the UAB Health Services & Outcomes Research Training Program, he came to UAB as Assistant Professor in the Department of Pediatrics at the University Of Alabama School Of Medicine, University of Alabama at Birmingham. He is also the medical informaticist at Children's Health System, Birmingham, AL. His research interests include use of health informatics in quality improvement and outcomes research. His research projects have included decision support systems using handheld computers, technology diffusion studies on computerized physician order entry, and health outcomes of highly advanced "wired" hospitals.

Dr. Yu received his medical degree at the University of the East RMMC College of Medicine (Philippines). He moved to the U.S. to pursue his Pediatric specialty training at the Children's Hospital of Wisconsin. He finished his pediatric residency in 1996 and moved to South Carolina where he practiced primary care pediatrics for 5 years. In 2001, he moved to Birmingham, Alabama, and became a staff physician at the Children's Hospital of Alabama where he practiced pediatric urgent care medicine. Dr. Yu received his Masters in Health Informatics in 2004 from the UAB School of Health Related Professions and his M.S.P.H. in Outcomes Research in 2005 from the UAB School of Public Health.

Feliciano B. Yu, Jr., MD, MSHI, MSPH, CPHIMS

Home: 5428 Sunrise Drive, Birmingham, AL 35242
Office: 1600 7th Avenue South, Children's Health System,
Information Technology Division, Suite 200-14, Birmingham, AL 35233
Email: FYu@peds.uab.edu   *Telephone*: (205) 212-7863   *Beeper:* (205) 954-0411

EDUCATION

Public Health UNIVERSITY OF ALABAMA at BIRMINGHAM
School of Public Health, Department of Healthcare Organization and Policy
Birmingham, Alabama
MS Public Health in Outcomes Research
August 2003 – December 2005

Health Informatics UNIVERSITY OF ALABAMA at BIRMINGHAM
School for Health Related Professions
Department of Health Services Administration, Health Informatics Program
Birmingham, Alabama
MS in Health Informatics
August 2001 – May 2004

OREGON HEALTH SCIENCES UNIVERSITY
School of Medicine, Department of Medical Informatics and Clinical Effectiveness
Portland, Oregon
Graduate Certificate Program courses in Medical Informatics (via Internet)
September 2000 – March 2001

Medicine
Fellowship: UNIVERSITY OF ALABAMA at BIRMINGHAM
Ruth L. Kirschstein National Research Service Awards Postdoctoral Scholar
The UAB Health Services and Outcomes Research Training Program
The UAB Center for Outcomes and Effectiveness Research and Education,
Department of Medicine, Division of Preventive Medicine
Birmingham, Alabama
Post-doctoral Fellowship   October 2003 – September 2005

Residency: CHILDREN'S HOSPITAL OF WISCONSIN
Medical College of Wisconsin
Milwaukee, Wisconsin
Pediatric Residency   July 1994 – June 1996

Internship: CHILDREN'S HOSPITAL OF WISCONSIN
Medical College of Wisconsin
Milwaukee, Wisconsin
Pediatric Internship   July 1993 – June 1994

EAST AVENUE MEDICAL CENTER
University of the East – RMMC College of Medicine
Metro Manila, Philippines
Transitional Internship   May 1991 – April 1992

MD: UNIVERSITY OF THE EAST - Ramon Magsaysay Memorial
Medical Center (UERMMMC) College of Medicine
Metro Manila, Philippines
Doctor of Medicine   June 1987 – March 1991

BS: UNIVERSITY OF THE PHILIPPINES College in Baguio (UPCB)
Baguio City, Philippines
Major in Biology   June 1983 – March 1987

CERTIFICATION   Certified Professional in Health Information Management Systems, Health Information
Management Systems Society (HIMSS) – July 2003
Diplomate**,** American Board of Pediatrics (ABP) – October 1997, recertification
pending
Fellow, American Academy of Pediatrics (AAP) – October 1997
Educational Commission for Foreign Medical Graduates (ECFMG) – May 1993
United States Medical Licensure Examination (USMLE) Steps I-III – 1992, 1994

LICENSURE   ALABAMA – since 2001   LN#24033
VIRGINIA – since 1999   LN# 0101222951 (Inactive)
SOUTH CAROLINA – since 1996   LN# 18721 (Inactive)
WISCONSIN – since 1994   LN# 36049 (Inactive)
DEA – current for both Federal and State

MEMBERSHIP   American Medical Informatics Association (AMIA)
Health Information Management Systems Society (HIMSS)
Health Level Seven (HL7) – Pediatric Data Standards SIG
Association of Medical Directors of Information Systems (AMDIS)

AWARDS   Distinguished paper award at AMIA 2005 Annual Symposium, Data Quality in the
Outpatient Setting: Impact on Clinical Decision Support Systems, Berner ES,
Kasiraman RK, Yu FB, Ray MN
Career Enhancement Award, UAB Office of Postdoctoral Education, February 2004
Ruth L. Kirschstein National Research Service Awards, National Institute of Health,
October 2003
"*Pat on the Back*" Award for Advancing Community Health - Dillon County Health
Department, 1999
Pee Dee Region Gold Ribbon Award Recipient for leading Breastfeeding Awareness –
South Carolina, 1998
Most Outstanding Intern - East Avenue Medical Center, Manila, Philippines, 1992

PUBLICATIONS   Yu FB, Houston TK, Ray MN, Garner, DQ, Berner ES, *Patterns of Use of handheld
Decision support tools in the clinical setting*. Medical Decision Making.
Accepted for publication, 2007.
Yu FB, Houston TK, *Association of objective quality of care measures among
"Most Wired" hospitals*, The Joint Commission Journal on Quality and
Patient Safety, 2007 Mar;33(3):136-44.
Ray MN, Houston TK, Yu FB, Menachemi N, Maisiak RS, Allison JJ, Berner
ES. (2006) *Development and Testing of a Scale to Assess Physician Attitudes
about Handheld Computers with Decision Support*. JAMIA 13(5) 567-572.
Yu FB, Allison JJ, Berner ES, Houston TK. *CPOE In The United States.*

Health Aff (Millwood). 2006 Mar-Apr;25(2):567.

Yu FB, Houston TK, Ray MN, Berner ES, *Predictors of use of handheld decision support tools in the clinical setting*. Medical Decision Making. 2005; 5(1):E40.

Berner ES, Ray MN, Kasiraman R, Yu FB, Houston TK, *Data Quality in the Outpatient Setting: Impact on Clinical Decision Support Systems*. AMIA Annu Symp Proc. 2005:41-5.

GRANTS Yu FB (PI), Pisu M, *Economic Impact of Computerized Physician Order Entry in Reducing Medication Errors at a Pediatric Hospital*, Children's Center for Research and Innovation, Birmingham, AL
January 2007 – indefinite ($60,000)

PRESENTATIONS Yu FB, *Association of Health Information Technology adoption on outcomes of care using objective measures of Quality*, UAB Department of Pediatrics Pediatric Outcomes Research Interest Group, Children's Health System, Birmingham, AL, December 6, 2006.

Yu FB, Houston TK, *Institutional Patient Safety Levels among Healthcare's Most Wired Hospitals*, 2006 Society for Medical Decision Making Annual Conference, Boston, MA – October 15, 2006
http://smdm.confex.com/smdm/2006ma/techprogram/P2543.HTM

Yu FB, *Reported adverse drug events among pediatrics hospitals with CPOE*, NACHRI Case-mix Users Group meeting, Alexandria, VA, June 15, 2006

Yu FB, *Assessing the impact of Health Information Technology adoption on outcomes of care using objective measures of Quality and Patient Safety*, Ohio State University Biomedical Informatics department, 3167 Graves Hall, 333 W 10th Ave, Columbus, OH, March 13, 2006

Yu FB, Berner ES, Allison AJ, Houston TK, *Association of Hospital Ownership and Resource Availability with Implementation of Computerized Physician Order Entry (CPOE),* Academy Health 2005 Annual Research Meeting, Boston, MA – June 26, 2005,
http://www.academyhealth.org/2005/studentposters.pdf

Yu FB, Berner ES, Allison AJ, Houston TK, *Association of Hospital Ownership and Resource Availability with Implementation of Computerized Physician Order Entry (CPOE),* 2005 National Research Service Award Annual meeting, Boston, MA – June 25, 2005.

Yu FB, Elbharawi T, *Framework for evaluating health information systems*, HSA Seminar Series, UAB Health Services Administration department, University of Alabama at Birmingham, Birmingham, AL – April 5, 2005

Yu FB, Houston TK, Ray MN, Berner ES, *Predictors of use of handheld decision support tools in the clinical setting*, Society for Medical Decision Making, Atlanta, GA – October 18, 2004,
http://smdm.confex.com/smdm/2004ga/techprogram/P1587.HTM

OTHER Yu FB, *Why an EHR for my practice?* CME developed for Alabama Quality Assurance Foundation, August 2005,
http://www.alabamacme.uab.edu/courses/EHR/IJ1000.html

Yu FB, *My New Practice Partner*, My Humble Opinion article series for pdaMD.com, 2000, http://www.pdamd.com/columns/column-47.xml

EXPERIENCE

Clinical: Assistant Professor, Division of Emergency Medicine, UAB Department of Pediatrics, Birmingham, AL, October 2005 – present

Attending Physician, Children's South After-Hours, Birmingham, AL, June 2001 – present

Medical Staff, Children's Hospital of Alabama – Birmingham, AL June 2001 – present

Clinical Instructor, Department of Pediatrics, Division of Emergency Medicine - University Of Alabama at Birmingham, School of Medicine June 2001 – September 2005

McLeod Pediatrics, primary care pediatric practice - Dillon, SC July 1996 – June 2001

Informatics: Case Mix Advisory Group (CMAG), National Association of Children's Hospitals and Related Institutions (NACHRI), April 2007 – present

Co-chair, Pediatric Health Information Technology Special Interest Group, Health Information Management Systems Society (HIMSS), April 2007 – present

Council member, National Association of Children's Hospitals and Related Institutions (NACHRI) Management Information Systems, November 2005 – present

Medical Informaticist, Information Technology Division, Children's Health System, Birmingham, AL, October 2005 - present

Medical Advisor for Clinical Informatics, Applied Informatics Group, University of Alabama at Birmingham Health System, Information Systems Department, February 2005 – September 2005

Clinical Informatics Committee member, Children's Hospital of Alabama, February 2005 – present

Health Level Seven, Pediatric Data Standards SIG Clinical Informatics representative, October 2003 – present

Executive Technology Committee, Children's Hospital of Alabama, July 2003 – present

Health Informatics Unit, UAB Center for Outcomes and Effectiveness Research and Education, Birmingham, AL, October 2003 – present

Administrative: Medical Director for Pediatric Services, St. Eugene Medical Center, Dillon, SC June 2000 – June 2001

Steering Committee, McLeod Physicians Associates, Florence, SC January 2000 – June 2001

Chairman, Perinatal Committee, St. Eugene Medical Center, 1999 – 2000

Head of Nursery, St. Eugene Medical Center, 1997

Research: Associate Scholar, UAB Lister Hill Center for Health Policy, Birmingham, AL, January 2006 – present

Scientist, UAB Center for Outcomes and Effectiveness Research and Education, Birmingham, AL, October 2005 – present

Associate, UAB Center for Outcomes and Effectiveness Research and Education, Birmingham, AL, January 2004 – September 2005

Community Service: Developed the Pediatric Asthma Program - St. Eugene Medical Center Dillon, SC 1997 – 2001

Spearheaded the Pediatric Rehabilitation Initiative that led to the development of a local pediatric physical rehabilitation program in the county –

St. Eugene Medical Center 1999
Organized the formation of a Pediatric Focus Group for Dillon County, South Carolina, 1999 - 2001
Led the Breastfeeding Initiative (Baby Friendly Hospital) - St. Eugene Medical Center 1998 - 2001
Initiated and chaired the Universal Hearing Screening program - St. Eugene Medical Center 1999

Teaching: Instructor, UAB School of Health Related Professions, Health Informatics Graduate Program, January 2006 to present
Preceptor, Nurse Practitioner Program, College of Nursing at the University of South Alabama, Fall of 2004
Preceptor, Nurse Practitioner Program, School of Nursing at the University of Alabama at Birmingham, Spring of 2004
Preceptor, Nurse Practitioner Program, School of Nursing at the University of Alabama at Birmingham, Fall of 2002
CPT and E/M Coding Trainer, American Academy of Pediatrics – South Carolina Chapter, 1999 to 2001
Preceptor, Graduate Nursing for the College of Nursing at the Medical University of South Carolina (MUSC), 1999 to 2000
Preceptor, Nurse Practitioner Program, College of Nursing at the University of South Carolina (USC), 1999 to 2000

Technology: SPSS Statistical Software
Microsoft Visual Basic programming, Microsoft Office Tools, Microsoft Access
Statistical Control Charts for Healthcare using Minitab® Statistical Software
Arden Syntax for Medical Logic Modules
PDA database building using HanDBase (Palm OS) – clinical applications
Internet company start-up in 1996, Philippines Online @ www.philonline.com

INTERESTS Medical Informatics
Outcomes Research
Quality Improvement
Primary and Urgent Care Medicine
Community Medicine

REFERENCES Available upon Request

Helmuth Orthner, PHD

        Dr. Orthner's research interests combine clinical applications with tools from computer science and high-speed communication systems for mobile environments. The next generation health information systems will require an infrastructure that combines traditional packet switching, circuit switching, and broadcasting in an intelligent, secure, and mobile manner. By intelligent we mean that the information system should utilize information about the user (e.g., physician) and his/her information domain (e.g., patient) to optimize the network use by guaranteeing the quality of communication services. By secure we mean that the information infrastructure is secure and can be audited. By mobile we mean that the location of the access points can move within buildings, between buildings, or even between cities.

Helmuth F. Orthner, Ph.D., FACMI

Professor of Health Informatics, Department of Health Services Administration, School of Health Professions, University of Alabama at Birmingham (UAB)
Professor, Department of Computer & Information Sciences, School of Natural Sciences and Mathematics, UAB
Senior Scientist, Center for Outcomes and Effectiveness Research and Education (COERE)
Senior Scientist, Center for Emergency Care and Disaster Preparedness (CECDP)
Senior Scientist, Center for Metabolic Bone Disease (CMBD)
Member, Informatics Core Advisory Committee, UAB General Clinical Research Center (GCRC)

Medical Informatics Research using web-based multi-media technologies and high-speed communication network in mobile environments such as pre-hospital emergency medicine and disaster preparedness. Dr. Orthner's research interests combine clinical applications with tools from computer science and high-speed communication systems for mobile environments. The next generation health information systems will require an infrastructure that combines traditional packet switching, circuit switching, and broadcasting in an intelligent, secure, and mobile manner. By intelligent we mean that the information system should utilize information about the user (e.g., physician) and his/her information domain (e.g., patient) to optimize the network use by guaranteeing the quality of communication services. By secure we mean that the information infrastructure is secure and can be audited. By mobile we mean that the location of the access points can move within buildings, between buildings, or even between cities. In order to achieve these goals, the following health information systems component must be in place:

- Integrated clinical information systems with special focus on the semantic information and work-flow issues.
- Advanced computer-based patient data repositories
- Intelligent user interfaces
- High-performance computer communication networks (LAN, wLAN, 3G, xDSL, etc.)
- Multi-media and web-based systems supporting text, voice, images, and video conferencing among healthcare providers and patients
- Distributed information system architectures for public health
- Secure workstations, networks, databases, and procedures and a scalable authentication system.

Abstract of Funded Research Projects:

Applications of Advanced Network Infrastructure in Health and Disaster Management
NLM N01-LM-3-3513; PI: Helmuth F. Orthner; 2003 – 2007.
The pre-hospital (or out-of-facility) medical emergency and public safety information environment is at a threshold of revolutionary change. The change is driven, in part, by several emerging technologies such as secure, high-speed wireless communication in the local and wide area networks (wLAN, 3G), Geographic Information Systems (GIS), Geo-Positional Systems (GPS), and powerful hand-held computing and communication devices. Integrating these technologies into an effective infrastructure supporting routine emergency medical services, with the scala-bility to support large-scale medical emergencies, is challenging. We propose to establish several testbeds that will enable us to iteratively develop, test and enhance capabilities new to the EMS community. One testbed will address the need for a new generation 9-1-1 Emergency Response and Medical Dispatch System. We are exploring solutions to integration and scalability challenges associated with interconnecting regional and national emergency response systems to enable robust, failsafe, and scalable operation even during unpredictable medical disasters.

We are using another testbed to investigate the application of enhanced clinical communication between the EMS providers in the field and the EMS physicians in the local healthcare organizations. This testbed, based on the emerging IP-based 3G infrastructure, is used for integrating and testing GIS and GPS devices in ambulances and devices used by the EMS providers to enhance their clinical effectiveness and documentation in the field. The testbed also identifies improvements in emergency department communi-

cation infrastructures. The clinical focus of this research will be high-risk patients with a history of acute myocardial infarctions (i.e. heart attack). These patients could benefit immensely from an emergency medical service that is "aware" of their high-risk cardiovascular conditions and capable of rapid, informed response in the event of out-of-hospital cardiopulmonary arrest (OOH-CA) or significant indications of acute myocardial infarction (i.e., a relapse or recurrence). This testbed allows us to investigate the advantages of enabling an emergency dispatcher to immediately identify and locate a high-risk patient on a GIS display overlaid with the locations of nearby defibrillation-capable responders and emergency departments who have the on-line resources needed by the patient.

Another testbed uses the campus-wide, high-performance fiber-optic network at UAB to study interactive broadcast quality multimedia video communication. HDTV and DTV videos will be produced using low-cost off-the-shelf high-resolution cameras from Sony and Cannon respectively. We are interfacing the testbed with UAB's Internet2 infrastructure for Quality of Service (QoS) studies using packet loss and jitter as the main indicators for QoS. The goal is to assess whether the next generation low-cost but near broadcast quality consumer video equipment will be useful for interactive clinical video communication and if this infrastructure enables remote clinical diagnosis and not just preliminary readings.

Abstract of Pending Research Projects:
Communications Laboratory for Medical Disaster Management
Department of Homeland Security (DHS) (via Johns Hopkins University as the prime contractor) in response to ONR BAA – #05-008; PI: Helmuth F. Orthner; 2005-2007. (Note: The $15 million contract was awarded to JHU on Dec 5, 2005)
The emergence of a true universal Internet-based infrastructure for wired and wireless communications provides an opportunity for a standards-based infrastructure for the EMS environment that is robust, failsafe, and scalable even in mass casualty situations. Using the IETF (Internet Engineering Task Force) 'ECRIT' (Emergency Context Resolution with Internet Technologies) standard, the 9-1-1 Call Centers are enabled to receive location information for VoIP (Voice over IP) emergency calls. These voice calls can be enhanced with text, images, and video information. If the patient is identified, vital information about the patient can also be provided to the emergency medical service (EMS) providers from a regional Emergency Patient (EMP) database. This improves the situational awareness of EMS and incident command centers personnel about affected patients.

The study has two specific aims: (1) Provide vital patient specific information to EMS providers and emergency department (ED) physicians in electronic form; and (2) Improve decision making capability of incident command centers (ICC) personnel to allow for efficient distribution of available resources.

The greatest challenge is the seamless integration of new technologies into the existing EMS information infrastructure. We need to know what is feasible and, if feasible, what is useful. For Aim 1, the amount of clinical information needed for emergency care is small and most of it is already available in electronic form in a hospital or clinic. However, most of this information is currently not accessible. Similarly, the status of the desirable resources in EDs or hospitals is usually not available to EMS personnel. We plan to incorporate this functionality into an on-line Internet-based system. For Aim 2, we will improve data acquisition in the field using handheld devices and transmit this data to the ICC, utilize GIS (Geographic Information Systems) and GPS (Geo-Positional System) technologies for monitoring the location of stationary and mobile resources, expand an existing system that monitors online available resources in hospitals, and an integrated command & control system enhanced with feeds from public television stations and UAB's Simulation Center.

Our premise is that the next generation Internet-based wireless communication infrastructure will support data messaging that allows us to study the integration issues and the feasibility and usefulness in a realistic manner. Further, the next generation ICC Systems and 911 Dispatch Centers need to be scalable and robust (failsafe) to withstand natural and man-made disasters. By migrating the ICC System and the 911 Systems to an Internet (Web-enabled) platform, we may be able to increase their scalability and robustness at a reasonable cost; after all, the initial Internet concept had these goals in mind.

Past Funded Research Projects:
1. **University of Utah Medical Informatics Training**, Medical Informatics Research Training NLM, NIH (LM-96-002), Co-PI: Helmuth F. Orthner; (PI: Reed Gardner) 1996 – 2001.
2. **Integrated Information Technologies for Emergency Medical Care**, NLM 99-NHAAP/VMS: *Informatics for the National Heart Attack Alert Program (NHAAP)*, Phase 1 (Planning). PI: Helmuth F. Orthner, 1998 – 1999.
3. **Integrated Information Technologies for Emergency Medical Care**, N01-LM-0-3524 *Informatics for the National Heart Attack Alert Program (NHAAP)*, Phase 2 (Feasibility). PI: Helmuth F. Orthner, 2000 – 2003.
4. **Development of Personal Agents for Information Retrieval**, NLM Applied Medical Informatics Fellowship for F38 LM07185-01. Helmuth F. Orthner, PhD (mentor), Dongquan Chen, PhD (trainee), 2001 – 2003.

Education:
1962	BS (equiv.)	Electrical Engineering	Higher Technical Institute, Innsbruck, Austria
1966	MS (equiv.)	EE & Communications	Technical University of Munich, Germany
1973	PhD	Biomedical Engineering	University of Pennsylvania, Philadelphia, PA

Positions and Appointment:
1972 – 1993   Instructor, Assist. Professor, Associate Professor (tenure 1979), Full Professor, Department of Computer Medicine, George Washington University School of Medicine, Washington, DC

1978 – 1993   Director, Office of Academic Computer Services, GWU Medical Center

1993 – 1998   Professor of Medical Informatics, University of Utah, Salt Lake City, UT

1998 – 2006   Director of the M.S. in Health Informatics Program, Department Health Services Administration, School of Health Professions, University of Alabama at Birmingham (UAB)

1998 –   Professor of Health Informatics, Department Health Services Administration, School of Health Professions, University of Alabama at Birmingham (UAB) Professor, Department of Computer and Information Science, UAB

Awards and Scientific Reviews:
1991   **AWARD** for an "*Outstanding Publication in the Category of Scientific and Technical Book*" presented to Helmuth F. Orthner and Bruce I. Blum as coeditors of the book "**Implementing Health Care Information Systems**" Springer-Verlag Inc., New York, Editorial Board of the Applied Physics Laboratory, The Johns Hopkins University, Baltimore, MD

2001   **AMIA President's Award 2001**: "**Presented in Gratitude and Acknowledgement for Outstanding Intellectual Leadership and Education Vision to the Field of Medical Informatics**" AMIA 2001 Fall Symposium, Washington, DC.

2002   **Site Visitor** for NCI's Breast and Colon Cancer Family Registries (BC-CFR) at University of California at Irvine.

2003   **Scientific Reviewer**, SBIR Topic 181 (Clinical Trials Data Collection Using Hand-held Technology), NCI, NIH, Bethesda, MD (March 18-20, 2003).
Scientific Reviewer, Biomedical Library Review Committee, NLM, NIH, Bethesda, MD

2004   **Scientific Reviewer**, Biomedical Library Review Committee, NLM, NIH, Bethesda, MD

2004   **Member of the Technical Evaluation Panel** (TEP) for NCI's BC-CFR, Round 1

2005   **Member of the TEP** for NCI's BC-CFR, Final Round

2005   **Scientific Reviewer**, NIH National Centers for Biomedical Computing (NIH/NCBC) Study Section, Center for Scientific Review, NIH, Bethesda, MD

2006   Chair, NCI SBIR Phase 2 Review on Topics 211 and 212.

Editorial Activities:
Series Editor (1989-1999): *Computers and Medicine*, Monograph Series, Springer-Verlag New York, NY. The monographs are hard bound and typeset reference books.

1. **Implementing Health Care Information Systems**, Helmuth F. Orthner and Bruce Blum, 1989.
2. **A Clinical Information System for Oncology**, John P. Enterline, Raymond E. Lenhard, Jr., and Bruce I. Blum, 1989.
3. **Nursing and Computers: An Anthology**, Virginia Saba, Karen Rieder, and Dorothy B. Pocklington, 1989.
4. **HELP: A Dynamic Hospital Information System**, Gilad J. Kuperman, Reed M. Gardner, and T. Allen Pryor, 1991.
5. **Decision Support Systems in Critical Care**, M. Michael Shabot and Reed M. Gardner, 1994.
6. **Information Retrieval: A Health Care Perspective**, William Hersh, 1996.
7. **Mental Health Computing**, Marvin J. Miller, Kenric W. Hammond, and Matthew G. Hile, 1996.
8. **Evaluation Methods in Medical Informatics**, Charles P. Friedman and Jeremy C. Wyatt with contributions by Bonnie Kaplan, 1997.
9. **The Pace System: An Expert Consulting System for Nursing**, Steven Evans, 1997.
10. **Knowledge Engineering in Health Informatics**, Homer R. Warner, Dean K. Sorenson, and Omar Bouhaddou, 1997
11. **Nursing and Computers: An Anthology, 1987 – 1996**, Virginia K. Saba, Dorothy B. Pocklington, and Kenneth P. Miller, 1998.

Publications & Presentations (since 2002):

1. **Software Agent to Automatically Update Genomic Information**, DQ Chen, HF Orthner, and SM Sell, 52[nd] Annual Meeting of the American Society of Human Genetics. Baltimore, Maryland. October 15-19, 2002. (http://genetics.faseb.org/genetics/ashg02/newashg02/f1287.htm)
2. **Integrated Information Technologies for Emergency Medical Care** (Abstract), Helmuth F. Orthner, and Nathan J. Almeida, National Heart Attack Alert Program (NHAAP) Coordinating Committee Meeting, Natcher Conference Center, NIH, Bethesda, Maryland; March 23, 2004.
3. **Wireless Local Area Networks in a Prehospital Environment**, Dongquan Chen, Seng-Jaw Soong, Gary J Grimes, and Helmuth F Orthner, BMC Medical Informatics and Decision Making 2004, 4:12 (www.biomedcentral.com/1472-6947/4/12)
4. **Personalized online information search and visualization**, Dongquan Chen, Helmuth F. Orthner, and Susan M Sell; BMC Medical Informatics and Decision Making 2005, 5:6; March 14, 2005 (www.biomedcentral.com/1472-6947/5/6).
5. **Information Infrastructure for Emergency Medical Services** (Poster), Helmuth Orthner, Ninad Mishra, Thomas Terndrup, Joseph Acker, Gary Grimes, Jill Gemmill, Marcie Battles; AMIA 2005 Annual Symposium, October 22-26, Washington, DC, p. 1067.
6. **A Study Design for Comparing Electronic Patient Care Report (ePCR) with Paper PCR in Pre-Hospital Care** (Poster), Devashish Saini, Amarinder Sandhu, Mandar M Gori, and Helmuth F. Orthner; AMIA 2005 Annual Symposium, October 22-26, Washington, DC, p. 1103 (Nominated for an Award).
7. **Optimizing Wireless Communication using Adaptive Sizing and Turbo Codes**, Manish S. Mittal, Jill Gemmill, and Helmuth F. Orthner, The 5[th] Annual Wireless Telecommunications Symposium - WTS 2006, Pomona, Ca, April 27-29, 2006; IEEE Computer Society Press.
8. **Online Medical Control in Protocols and Practice**, Devashish Saini, Mandar M Gori, Muzna Mirza, Shannon W. Stephens, and Helmuth F Orthner; Proceedings of the Southeastern SAEM Regional Conference, Greensboro, NC, March 24-25, 2006.
9. **Requirements Analysis for Pre-Hospital Electronic Documentation**, Gori M. Mandar, Devashish Saini, Muzna Mirza, Marcie H Battles, David G Nathan, and Helmuth F Orthner, Proceedings of the Southeastern SAEM Regional Conference, Greensboro, NC, March 24-25, 2006.
10. **Comparison of Efficiency of Emergency Medical Dispatching Algorithms**; Mandar M Gori, Devashish Saini, Marcie H Battles, and Helmuth F Orthner, Proceedings of the AMIA 2005 Spring Congress, Phoenix, AZ, May 16-18, 2006.
11. **Chest Pain and Validity of an Emergency Medical Dispatch Algorithm**; Ninad Mishra, Helmuth F Orthner, and David C. Pigott; Proceedings of the AMIA 2006 Symposium, Washington, DC, Nov 11-15, 2006.
12. **Application of Speech Recognition Data Entry Enhancements in an Electronic Patient Care Report (ePCR)**, Giovanni Mazza, Marcie H Battles, and Helmuth F Orthner; Proceedings of the AMIA 2006 Symposium, Washington, DC, Nov 11-15, 2006..
13. **Development and Testing of an Algorithm for Efficient Resource Positioning in Pre-Hospital Emergency Care**, Devashish Saini, Giovanni Mazza, Najaf Shah, Muzna Mirza, Mandar M. Gori, Hari K Nandigam, and Helmuth F Orthner; Proceedings of the AMIA 2006 Symposium, Washington, DC, Nov 11-15, 2006.
14. **A Regional Database of Antidote Availability**, Muzna Mirza, Devashish Saini, Mary A Dickens, Ziad Kazzi, and Helmuth F Orthner; Proceedings of the AMIA 2006 Symposium, Washington, DC, Nov 11-15, 2006.
15. **Decision Support Tool for Emergency Medical Dispatch of Trauma Cases**, Muzna Mirza, MD; Devashish Saini, MD; Todd Brown, MD; and Helmuth F. Orthner, PhD; Proceeding of the AMIA 2007 Spring Congress, Orlando, FL.

Peter Glaeser, MD

Dr. Peter Glaeser is the Medical director of the Emergency Department at Children's Hospital and Professor and Division Director of Pediatric Emergency Medicine in the Department of Pediatrics at the University of Alabama at Birmingham.

He has a Bachelor of Science Degree from Marquette University and a Medical Degree from the Medical College of Wisconsin. He did his Pediatric Internship and Residency at Children's Hospital of Wisconsin. He is board certified in Pediatrics and Pediatric Emergency Medicine (PEM). He practiced PEM at the Children's Hospital of Wisconsin for 12 years prior to coming to Birmingham in 1996.

Other positions/appointments include: President Elect, Medical Staff of Children's Health System, Past Chair and Member, Children's Hospital Clinical Outcomes Committee, and Member of the UAB Risk Management Trust Fund Committee.

His primary academic interest has been in the out-of-hospital care of sick and injured children (EMS) He has served on numerous national EMS committees and currently is the Treasurer of the Board of National Registry of Emergency Medical Technicians (NREMT).

In 1994-1995 he was a consultant/instructor for Project Hope and Egyptian Red Crescent Society: Development of EMS in Egypt, Cairo Egypt. While in Egypt, he met his wife, Elizabeth Elliott. He has many hobbies but some of his favorites are woodworking, gardening, and spending time with his wife.

CURRICULUM VITAE

University of Alabama at Birmingham
School of Medicine Faculty

April 27, 2006

PERSONAL INFORMATION:
Peter W. Glaeser, M.D.
USA
390-54-4675
973 Linwood Road
Birmingham, Al 35222
(205) 939-9587

RANK/TITLE:
Professor
Department of Pediatrics
Director, Pediatric Emergency Medicine Div
The Children's Hospital
Suite 205 Midtown Bldg.
1600 6th Avenue South
Birmingham, Alabama 35233
(205)939-9587

HOSPITAL AND OTHER (NON ACADEMIC) APPOINTMENTS:

2005 – Present	Elected Treasurer of Board of NREMT
2005 – Present	President Elect, Medical Staff of Children's Health System
2003 – Present	Appointed to Standards and Examination Subcommittee of NREMT Board
2000 – Present	Elected to Board of National Registry of EMT's (NREMT)
2000 – 2006	Chair, Hospital Clinical Outcomes Committee
1999 – Present	Medical Director, Children's South After Hours Clinic
1996 - Present	Director, Pediatric Emergency Medicine University of Alabama at Birmingham Children's Health System
1997 - 2001	Chair, Alabama American College of Emergency Physicians Pediatric Subcommittee
1996 - Present	Elected to Birmingham Regional Emergency Medical Services System (BREMSS)

Executive Committee

1997 - 2002   Vice- Chair BREMSS Trauma Operations Committee

1984 - 1996   Emergency Department Attending Physician
               Children's Hospital of Wisconsin
               Milwaukee, Wisconsin

1988 - 1990   Acting Associate Medical Director
               Emergency Department Trauma Center
               Children's Hospital of Wisconsin
               Milwaukee, Wisconsin

1984 - 1996   Director, Pediatric Advanced Life
               Support Course (PALS)
               Milwaukee, Wisconsin

1984 - 1996   Paramedic Liaison & Instructor
               Milwaukee County Paramedics
               Milwaukee, Wisconsin

1985 - 1996   Director, Paramedic Course
               Milwaukee County Paramedics
               Milwaukee, Wisconsin

1988 - 1996   National Faculty Member, PALS
               American Heart Association

1988 - 1996   Chair, PALS Task Force
               American Heart Association of
               Wisconsin Affiliate Faculty

1989 - 1992   Head, Subcommittee on Pediatric
               Prehospital Educational Resources
               AAP-SEM

1989 - 1998   Appointed to Represent AAP at the
               Commission on Accreditation of Allied Health Educational Programs: Joint Review
               Committee on Educational Programs for the EMT-P
               (2 appointments nationally)

1993 - 1994   Chair, Joint Review Committee
               Symposium Subcommittee

1990 - 1994   Joint Review Committee - AAP
               Quality Assurance Subcommittee
               for the EMT-P

1991 - 1998	Joint Review Committee - AAP EMT-P Site Visitor
1992 - 1994	Vice-Chair of the Joint Review Committee - AAP
1992 - 1993	Chair, Joint Review Committee - AAP Quality Assurance Subcommittee for the EMT-P
1994 - 1998	Chair, AAP/SEM EMS Subcommittee
1994 - 1996	Chair, Joint Review Committee on Educational Programs for the EMT-P
1995 - 1998	AAP Representative to NHTSA Grant project to create National Standardized Curricula for EMT-I and EMT-P
1995 - 1996	AAP Representative to NEMSCRA project to standardize pediatric prehospital equipment nationally.

EDUCATION:

1972 - 1976	B.S. Marquette University Milwaukee, Wisconsin
1976 - 1981	M.D. Medical College of Wisconsin Milwaukee, Wisconsin

MILITARY SERVICE:

None

LICENSES:

State of Alabama #19725
State of Wisconsin #24521 (not current)

BOARD CERTIFICATIONS:

Written: 1984   Pediatrics
Oral: 1986   American Board of Pediatrics
                   1992   Pediatric Emergency Medicine
                          Sub-board certification
                   1998   PEM sub-board recertification

POSTDOCTORAL TRAINING:

1981 - 1982   Pediatric Internship
                          Children's Hospital of Wisconsin
                          Milwaukee, Wisconsin

1982 - 1984   Pediatric Residency
                          Children's Hospital of Wisconsin
                          Milwaukee, Wisconsin

ACADEMIC APPOINTMENTS:

1996 - Present   Professor of Pediatrics
                          University of Alabama at Birmingham

1994 - 1996   Associate Professor of Clinical Pediatrics
                          & Clinical Emergency Medicine
                          Medical College of Wisconsin
                          Milwaukee, Wisconsin

1992 - 1994   Associate Professor of Pediatrics
                          Medical College of Wisconsin
                          Milwaukee, Wisconsin

1989 - 1992   Assistant Professor of Pediatrics
                          and Surgery
                          Medical College of Wisconsin
                          Milwaukee, Wisconsin

1986 - 1989   Assistant Professor of Pediatrics
                          Medical College of Wisconsin
                          Milwaukee, Wisconsin

1985 - 1986   Instructor of Surgery & Pediatrics
                          Medical College of Wisconsin
                          Milwaukee, Wisconsin

AWARDS/HONORS:

<u>Marquette Honors</u>
Alpha Sigma Nu
Phi Beta Kappa
Robert McCahill Award: Scholar/Athlete
Magna Cum Laude

1999	Fellow, American College of Emergency Physicians
1998-1999 2000-present	Elected to the Board of the National Registry of EMTs
2005	Elected Treasurer of the NREMT
1998	Outstanding Service Award: Center for Emergency Medicine National Standard Curricula: EMT-I and EMT-P
1996	R Floyd Yarbrough EMS Award: Trauma Implementation Committee, BREMSS
1995	American Heart Association Service Award
1994	"Excellence in Teaching" Award from Emergency Medicine Residents, MCOW
1994 and 2000	Nominated to AAP/SEM Executive Committee Nominated to AAP-Committee on Pediatric Emergency Medicine
1992	American Heart Association of Wisconsin Professional Practice Award

PROFESSIONAL SOCIETIES AND MEMBERSHIPS:

Fellow - American Academy of Pediatrics

Member - Section on Emergency Medicine, AAP

Member - Prehospital Care Committee, AAP

Member and Fellow - American College of Emergency Physicians

Member - National Association of EMS Physicians

Member - Local and State medical societies.

INTERNATIONAL:

1994-1995 Consultant/Instructor: Project Hope and Egyptian
Red Crescent Society: Development of EMS in Egypt, Cairo Egypt

COUNCILS AND COMMITTEES:

National Advisory Committee:

2005 – Present	Invited member of Physician Advisory Committee: NHTSA, HRSA, EMSC funded project to create National EMS Education Standards.
2003 – 2004	Represented AAP on NHTSA granted project: The National EMS Scope of Practice Model.
2000 - 2001	Integrating EMS with Public Health: EMS Agenda for the Future; National Association of EMS Physicians (NAEMSP) and American Public Health Association. Grant from National Highway Traffic Safety Administration (NHTSA).
May 2000	NHTSA/ACEP sponsored participant in EMS Leaders 2000 conference.
1999	Represented NREMTs on distance learning project sponsored by NREMT and NHTSA.
1995 - 1998	AAP Representative to National Review Team: NHTSA Grant project to create National Standardized curricula for EMT-I and EMT-P.
1996 - 1998	Steering Committee: Implementation of EMS Agenda for the Future. National Association of EMS Physicians (NAEMSP) Grant from National Highway Traffic Safety Administration (NHTSA).
1998 - 1999	Represented NAEMSP on MCHB sponsored project; National Consensus Pediatric Prehospital protocols.
1998 - 1999	Represented AAP on Fed. Government grant to develop prehospital guidelines for the care of patients with severe head trauma.
1998 -2000	Represented AAP on NAEMSP project to create an educational curriculum and "National Guidelines for EMS Medical Direction; NHTSA grant.
1997	Represented AAP at the National Association of Emergency Medical Technicians Consensus Committee on Pre-Hospital Pediatric Training.
1989 - 1996	National Faculty Member

	PALS - American Heart Association
1989 - 1994	Head, Subcommittee on Pediatric Prehospital Education Resources AAP-SEM
1989 - 1998	Representative (appointed) of the AAP at CAAHEP Joint Review Committee on Educational Programs for the EMT-P (2 appointments Nationally)

State Advisory Committee:

2000 – 2004	Appointed to American College of Surgeons Alabama Committee on Trauma
1997 - 2002	Alabama American College of Emergency Physicians Pediatric Subcommittee
1989 - 1990	Wisconsin EMS-C Grant Training Development Committee Assessment and Treatment Guidelines Committee
1988 - 1996	Wisconsin ECC Member American Heart Association
1988 - 1996	Chair, American Heart Association Task Force on PALS
1988 - 1996	PALS Affiliate Faculty, Wisconsin AHA

Local Advisory Committees:

1996 - Present	BREMSS Executive Committee and Board BREMSS Medical Control & Accountability Committee BREMSS Vice Chair Trauma Operations & Oversight BREMSS Trauma quality assurance committee.
1993 - 1996	Mayoral appointment to the Board of Health, City of Wauwatosa
1994 - 1995	Acting Medical Consultant to the Wauwatosa Health Department

Hospital Committees:

2005 – Present   Medical Executive Committee
                        Children's Health System

2000 - Present   Clinical Outcomes Committee
                        Children's Hospital of Alabama

1999 – Present   Patient Representation Committee
                        Children's Hospital of Alabama

1999 – 2002   COO's Task Force on improvement of emergency department
                        Children's Hospital of Alabama

1999 – Present   ED Information System Implementation and Stakeholders Committees
                        Children's Hospital of Alabama

1999   Conscious Sedation Credentialing Committee
                        Children's Hospital of Alabama

1998 - Present   Hospital Performance Improvement Committee
                        Children's Hospital of Alabama

1998 - 2004   Technology Information Steering Committee
                        Children's Hospital of Alabama

1997 - 2004   Child Abuse/CHIPS Committee
                        Children's Hospital of Alabama

1997 - 2001   Hospital Medical Peer Review Committee
                        Children's Hospital of Alabama

1996 - Present   Pediatric Residency Recruitment Committee
                        Children's Hospital of Alabama

1996 - Present   Emergency Department Re-design Committee
                        Children's Hospital of Alabama

1997   Chairman's Patient Care Committee
                        Department of Pediatrics
                        University of Alabama at Birmingham

Medical College of WI Committees
                        Emergency Care Committee
                        Children's Hospital of Wisconsin

Milwaukee, Wisconsin

1993 - 1996   Emergency Department Collaborative
                                     Practice Committee
                                     Children's Hospital of Wisconsin
                                     Milwaukee, Wisconsin

1993   Emergency Department Violence
                                     Task Force
                                     Children's Hospital of Wisconsin
                                     Milwaukee, Wisconsin

Education Committee
Medical College of Wisconsin
Milwaukee, Wisconsin

Resident Recruitment
Medical College of Wisconsin
Milwaukee, Wisconsin

Faculty Retreat Committee
Department of Pediatrics
Medical College of Wisconsin
Milwaukee, Wisconsin

Miscellaneous:
1998   Selected as White Paper panel participant; MCHB/EMSC. Paper entitled;
                                     *EMSC Education and Training Considerations in a Managed Care
                                     Environment* (in press).

1996 - 1998   Subject Matter Expert: Life Span Development section of EMT-I and EMT-P
                                     National Standard Curricula. DOT/NHTSA and HRSA grant.

1996, 1997   Reviewer, EMSC grant applications, Washington, D.C. HRSA/MCHB

1992, 1996   Consultant/Exam review: National Registry
                                     Board Exam for paramedic licensure; Columbus, Ohio

Manuscript review for *Pediatric Emergency Care* , *Pediatrics*, and *Annals of Emergency Medicine* Journals

Board Question Submission to the American Board of Pediatrics;
Subboard on Pediatric Emergency Medicine

Book Review: Emergency Medicine; A Comprehensive Guide
ACEP, third edition, McGraw Hill

Review of National First Responder Curriculum (NHTSA Grant)
Reviewer of 1995 American Heart Association Pediatric Advanced Life Support Instructor's Manual

UNIVERSITY ACTIVITIES:
Division Director, Pediatric Emergency Medicine.

EDITORIAL BOARD MEMBERSHIPS: none

MAJOR RESEARCH INTERESTS:
Clinical research in pediatric emergency medicine with a focus on prehospital care/interventions.   Also interested in competency based educational outcomes research.

TEACHING   EXPERIENCE:
Twenty two years of clinical (bedside and problem based), traditional didactic (classroom), and outreach education in local, regional, national, and international settings. Students have included K-12 (community-outreach), medical graduate and post-graduate and allied health professionals in initial training and continuing education. Appointments, committees, and awards cited above reflect interest and expertise in education.

INVITED LECTURES, WORKSHOPS, SITE VISITS: AVAILABLE UPON REQUEST

GRANT SUPPORT: none

BIBLIOGRAPHY:
Manuscripts: Published

Pediatrics Committee, NAEMSP, Glaeser, P. Panel Member: EMSC Partnership for Children/National Association of EMS Physicians Model Pediatric Protocols: 2003 Revision. Prehosp Emerg Care; 2004 8(4): 343-365

Pershad J, Redden D, Glaeser, P: Are pediatric emergency medicine training programs adequately preparing graduates for involvement in EMS? Pediatr Emerg Care; 2000 16(6): 391-393.

Glaeser PW, Linzer J, Tunic M, Henderson D, Ball J: Survey of Nationally Registered Emergency Medical Service Providers: Pediatric Education. Ann Emerg Med; 2000 36:1: 33-38.

Gausche M, Henderson DB, Brownstein D, et al: Education of out-of-hospital emergency medical personnel in pediatrics: Report of a national task force. *Ann Emerg Med* 1998 Jan;31(1):58-64. Glaeser P. Task force member. Published simultaneously in Pediatr Emerg. Care.

Seidel J, Glaeser P, Zimmerman L, et al: Guidelines for Pediatric Equipment and Supplies for Basic and

Advanced Life Support Ambulances. Pediatr Emerg Care 1996; 12 (6): 452-453. Published simultaneously in Ann Emerg Med 1996;28:699-701

Glaeser PW and Losek J: Emergency use of intraosseous infusions in children. AJEM 1986; 4:34-36.

Losek JD, Hennes H, Glaeser P, Hendley G, Nelson DB: Prehospital care of the pulseless, nonbreathing pediatric patient. AJEM 1987; 5:370-374.

Walsh-Kelly C, Berens R, Glaeser P, Losek J: Intraosseous infusion of phenytoin: A case report. AJEM 1986; 4:523-523.

Losek J, Walsh-Kelly C, Glaeser P: Pediatric emergency departments. Pediatr Emerg Care 1986; 2:215-217.

Glaeser P, Losek J, Nelson D, et al: Pediatric intraosseous infusions: Impact on vascular access time. AJEM 1988; 6:330-332.

Smith DS, Losek JD, Glaeser PW, Walsh-Kelly CM: Pediatric sexual abuse management in a sample of children's hospitals. Pediatr Emerg Med 1988; 4:177-179.

Glaeser PW, Losek JD: Intraosseous needles: New and improved. Pediatr Emerg Care 1988; 4:135-136.

Losek JD, Glaeser PW, Hennes H, Bonadio WA, Smith D, Walsh-Kelly CM: Prehospital pediatric endotracheal intubation performance review. Pediatr Emerg Care 1989; 5:1-4.

Losek JD, Glaeser PW, Smith D, Hennes H, Hendley G: Prehospital countershock treatment of pediatric asystole, Am J Emerg Med 1989; 7:571-575.

Kelly KJ, Glaeser PW, Rice TB, Wendelberger KJ: Profound accidental hypothermia and freeze injury of the extremities in a child. Crit Care Med 1990; 18:679-680.

Hennes H, Bonadio W, Glaeser PW, Losek JD, Walsh-Kelly C, Smith D, Wagner V: The effect of oral midazolam on anxiety of preschool children during laceration repair. Ann Emerg Med, 1990; 19:1006-1009.

Walsh-Kelly CM, Nelson DB, Smith DS, Losek JD, Melzer-Lange M, Hennes HM, Glaeser PW: Clinical predictors of bacterial versus aseptic meningitis in childhood. Ann Emerg Med 1992; 21:910-914.

Glaeser PW, Hellmich TR, Szewczuga D, Losek JD, Smith DS: Five year experience in prehospital intraosseous infusions in children and adults. Ann Emergency Med 1993; 22:119-124.

Smith DS, Bonadio WA, Losek JD, Walsh-Kelly CM, Hennes HM, Glaeser PW, Melzer-Lange M, Rimm A: The role of abdominal x-rays in the diagnosis and management of intussusception. Pediatr Emerg Care 1993; 8:325-327.

Glaeser PW, Hellmich TR, Szeczuga D, Losek JD, Smith DS: Five year experience in prehospital intraosseous infusions in children and adults. 1994 Yearbook of Anesthesia and Pain Management.

Smith D, Walsh-Kelly C, Hennes H, Melzer-Lange M, Bonadio W, Losek J, Glaeser PW: Abdominal x-rays, intussusception and the emergency department. Pediatr Emerg Care 1992.

Losek JD, Szewczuga D, Glaeser PW: Improved prehospital pediatric ALS care after an EMT-Paramedic clinical training course. Am J Emerg Med 1994; 12:429-432.

ABSTRACTS:

Smith D, Walsh-Kelly C, Hennes H, Melzer-Lange M, Bonadio W, Losek J, Glaeser P: Abdominal x-rays, intussusception and the emergency department. (Abstract - The American Pediatric Society), APA/Spr Meeting, California, May 1990.

Hennes H, Smith D, Glaeser PW, Wagner V, Bonadio WA, Walsh-Kelly C, Losek JD: Sedation of preschool children during laceration repair. Abstract - The Society for Pediatric Research, 1988.

MANUSCRIPTS SUBMITTED:

OTHER PUBLICATIONS:

Glaeser P: Out of Hospital Intubation of Children; Invited editorial JAMA 2000: 283 (6) 797-798

Givens TG, Walsh-Kelly C, Glaeser P, et al: Management of Children at Risk for Occult Bacteremia. Letter; Pediatr Emerg Care 1996: 12 (6) 460-462.

Maes HM, Garland JS, Glaeser PW: VCR's and children. Letter. Wis Med J 1988; 87:7-8.

BOOKS:

George L. Foltin, Michael G. Tunik, Arthur Cooper, David Markenson, Marsha Treiber, Regina Phillips, Tamia Karpeles.(Editors) *Teaching Resource for Instructors in Prehospital Pediatrics.* New York, NY: Center for Pediatric Emergency Medicine, 1998. Contributor and Review Board: Glaeser PW.

Sallam R. (Ed) *Text Book of Advanced Emergency Medical Care.* Cairo, Egypt: Project Hope and Egyptian Red Crescent Society. Glaeser PW; Burns, Emergency Vascular Access chapters.

Pediatric Advanced Life Support Instructor's Manual. Ed Quan L, Seidel JS American Heart Association; 1995 Glaeser PW reviewer.

Jennifer McCain, MD

Dr. Jennifer McCain is an Assistant Professor of Pediatric Emergency Medicine at the University of Alabama at Birmingham School of Medicine. She has just completed her fellowship in pediatric emergency medicine at UAB where she was honored with an award for teaching by the residents. She presented abstracts at 2 national meetings during her fellowship. As she begins her career in academic medicine, her major goal is to develop a telemedicine program in the emergency department. She also is interested in injury prevention and resident and fellow education.

Curriculum Vitae
Jennifer McCain, MD, FAAP

May 1, 2007

PERSONAL INFORMATION

Name:	Jennifer E. McCain, M.D.
Date of Birth:	August 14, 1975
Place of Birth:	Valdosta, Georgia
Social Security Number:	259-21-2469
Home Address:	216 Kent Drive
	Birmingham, AL 35209
Home Telephone:	205-942-8726

PROFESSIONAL INFORMATION

Department:	Pediatrics
Business Address:	Children's Hospital
	Division of Emergency Medicine
	1600 7th Ave South
	Midtown Center, Suite 205
	Birmingham, AL 35233
Business Telephone:	205-939-9587
Business Fax:	205-975-4623
E-mail:	jmccain@peds.uab.edu

EDUCATION:

Years	Institution	Degree
1997-2001	Medical College of Georgia	MD
1993-1997	University of Georgia	BS- Microbiology

POSTDOCTORAL TRAINING:

Years	Institution	Position
2004-2007	University of Alabama-Birmingham Department of Pediatrics Division of Emergency Medicine	Fellow
2001-2004	University of Alabama-Birmingham Department of Pediatrics	Resident

ACADEMIC APPOINTMENTS:

Years	Institution	Rank
2007-	University of Alabama-Birmingham	Assistant Professor
2004-2007	University of Alabama-Birmingham	Instructor

LICENSURE:

2002-present   Alabama State Medical License #25007

BOARD CERTIFICATION:

American Board of Pediatrics, October 2005

OTHER CERTIFICATIONS:

1999-present	Basic Life Support-Provider
2001-present	Basic Life Support-Instructor
2001-present	Neonatal Advanced Life Support- Provider
2001-present	Pediatric Advanced Life Support-Provider
2003-present	Pediatric Advanced Life Support-Instructor
2004-present	Advanced Trauma Life Support
2004-present	ED Medical Director's Course
2003-present	Human Subjects Protection Training Program for Investigators (with yearly updates)

AWARDS/HONORS:

May 2006   Quarterback Club Subspecialty Education Award for excellence in resident education

May 2005   Awarded full scholarship from the national office of Injury Free Coalition for Kids to attend the week-long Safety School at the National Program for Playground Safety in Cedar Falls, Iowa.

PROFESSIONAL SOCIETIES:

2001-present	American Academy of Pediatrics
2007-present	American Telemedicine Association

COMMITTEES:

2004-present   Injury Free Coalition for Kids, Children's Hospital of Alabama

EDUCATIONAL ACTIVITIES:

Resident Noon Conference: Injury Prevention

Fellow Lecture: Altered Mental Status in Children
Resident Conference: Snake Bites
Resident Conference: Minor Head Trauma in Children
Morbidity and Mortality Conference: Complications of Sinusitis in Children
Toxicology Lecture: Amphetamines
PALS Instructor

GRANT SUPPORT:

Title	Role	Amount	Date
Allstate Foundation Playground Grant	Co-investigator	$70,000	May 2005

RESEARCH EXPERIENCE:

Primary Investigator, Do Parents Give Ibuprofen or Acetaminophen to Children Prior to Emergency Department Visits for Fever or Pain? IRB-approved survey given to families in the ED, June-August 2004, results presented at SSPR February 2005 and at PAS in May 2005. Currently a manuscript is being prepared for publication.

Primary Investigator, Falls in the Pediatric Population of Jefferson County, Alabama. IRB-approved chart review conducted in September 2003. Results presented at SSPR in February 2004 and at AAP in October 2004. Currently a manuscript is being prepared for publication.

Research Assistant, Impact of the Rapid Diagnosis of Influenza on Physician Decision – Making and Patient Management in the Pediatric Emergency Department: Results of a Randomized, Prospective, Controlled Trail, Primary Investigator – Aleta Bonner, M.D.

INVITED PRESENTATIONS:

McCain J, Monroe K, King W: Are Injuries Which Occur on Home Playgrounds More Severe Than Those Which Occur on Public Playgrounds? Society for Pediatric Research, New Orleans, LA, February 2007.

McCain J, Dimmitt R: Case Report: Neonatal Heatstroke. Society for Pediatric Research, Atlanta, GA, March 2006

POSTER PRESENTATIONS:

McCain J, Monroe K, King W, Freeman C: Do Parents Give Ibuprofen or Acetaminophen to Children Prior to Emergency Department Visits for Fever or Pain? Pediatric Academic Society, Washington DC, May 2005.

McCain J, Monroe K, King W, Freeman C: Do Parents Give Ibuprofen or Acetaminophen to Children Prior to Emergency Department Visits for Fever or Pain? Society for Pediatric Research, New Orleans, LA, February 2005.

McCain J, Monroe K, King W: Epidemiology of Severe Falls in Patients Admitted to a Children's Hospital, American Academy of Pediatrics, San Francisco, CA, October 2004.

McCain J, Monroe K, King W: Epidemiology of Falls in the Pediatric Population of Jefferson County, Alabama, Society for Pediatric Research, New Orleans, LA, February 2004.

PEER REVIEW ABSTRACTS:

McCain J, Monroe K, King W: Are Injuries Which Occur on Home Playgrounds More Severe Than Those Which Occur on Public Playgrounds? *Journal of Investigative Medicine.* January 2007; 55(1).

McCain J, Dimmitt R: Case Report: Neonatal Heatstroke. *Journal of Investigative Medicine.* January 2006; 54(1).

McCain J, Monroe K, King W, Freeman C: Do Parents Give Ibuprofen or Acetaminophen to Children Prior to Emergency Department Visits for Fever or Pain? *Journal of Investigative Medicine.* January 2005; 53 (1).

McCain J, Monroe K, King W: Epidemiology of Falls in the Pediatric Population of Jefferson County, Alabama. *Journal of Investigative Medicine*. January 2004; 52 (1).

COMMUNITY ACTIVITIES:

Free Health Clinic for Hurricane Katrina evacuees. Red Cross at BJCC and Shades Valley Baptist Church; September 2-9, 2005.

IFCK Health Fair Volunteer. May 2004, May 2005.

Other Letters of Support

May 7, 2007

Feliciano Yu, M.D., MSHI, MSPH, CPHIMS
Assistant Professor, Division of Emergency Medicine
Department of Pediatrics, University of Alabama at Birmingham School of Medicine
Medical Informaticist, Children's Health System
Information Technology Division
Park Place II, Suite 200-14
1600 7th Avenue South
Birmingham, Alabama 35233

Dear Dr. Yu:

On behalf of the Children's Hospital of Alabama, I am writing to express my strong support of the Alabama Pediatric Health Access (ALPHA) Network, and for the proposal to the Federal Communications Commission to provide pilot funding for the network. The ALPHA Network presents an outstanding opportunity to expand access to the pediatric expertise of Children's Hospital—the nation's tenth-largest pediatric medical center—among rural and other underserved populations throughout our state.

Children's Hospital is enthusiastically committed to this cooperative initiative, and views the ALPHA Network as the first step in a comprehensive statewide program of pediatric telemedicine. Receiving the requested pilot grant from the FCC will enable us to step up the timetable for both short-term implementation and long-term development of telemedicine services for the children of Alabama.

Thank you for your work on this extremely worthy grant proposal.

Sincerely,

Jim Dearth, M.D.
President and CEO

Feliciano Yu, M.D., MSHI, MSPH, CPHIMS
Assistant Professor, Division of Emergency Medicine
Department of Pediatrics
University of Alabama at Birmingham School of Medicine
Medical Informaticist, Children's Health System
Information Technology Division
Park Place II, Suite 200-14
1600 7th Avenue South
Birmingham, Alabama 35233

Dear Dr. Yu:

This letter is to express my full support of the application by the Children's Hospital of Alabama for a grant from Federal Communications Commission. If awarded, the grant for the Alabama Pediatric Health Access (ALPHA) Network will play an instrumental role in expanding access to pediatric services across Alabama.

From an information technology perspective, Children's Hospital is committed to supporting the development of the ALPHA Network. The Hospital will provide IT management, maintain the network infrastructure to be established through the program, and devote the resources and personnel necessary to implement and sustain the program over the long term.

Thank you for spearheading the application for an FCC grant for the ALPHA Network. We look forward to approval of our application, and to implementing the network with all due expedience.

Sincerely,

Michael E. McDevitt
Executive Vice President / CIO

May 7, 2007

Feliciano Yu, M.D., MSHI, MSPH, CPHIMS
Assistant Professor, Division of Emergency Medicine
Department of Pediatrics, University of Alabama at Birmingham School of Medicine
Medical Informaticist, Children's Health System
Information Technology Division
Park Place II, Suite 200-14
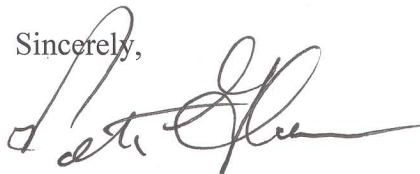1600 7th Avenue South
Birmingham, Alabama 35233

Dear Dr. Yu:

This letter is in support of the application for a Federal Communications Commission grant to the Children's Hospital of Alabama. If awarded, the grant will help fund implementation of the Alabama Pediatric Health Access (ALPHA) Network, a cooperative effort to utilize telemedicine to expand access to emergency pediatric medical services.

As the nation's tenth-largest center for pediatric medicine, Children's Hospital is at the forefront of pediatric health care in Alabama. Implementation and support of the ALPHA Network is an expression of the Hospital's commitment to the health and safety of Alabama children; it also represents a golden opportunity to advance both emergency services and telemedical services in general in a state with significantly underserved populations.

We are hopeful that the FCC will support enhanced medical access for Alabama's children by approving the requested funding for the ALPHA Network. Your work in preparing the grant application, and in developing this important initiative, is greatly appreciated.

Sincerely,

Dr. Peter Glaeser
Professor and Director
Pediatric Emergency Medicine

CHILDREN'S
HOSPITAL®

Children are the
center of our lives.

1600 7th Avenue S.

Birmingham, AL 35233

Phone: (205) 939-9100

www.chsys.org

May 7, 2007

To Whom It May Concern:

I am writing this letter in support of the grant application to the FCC for the Alabama Pediatric Health Access (ALPHA) Network. The Children's Hospital of Alabama is interested in maintaining the mission of the hospital "to provide the finest pediatric health services to all children" through the use of the latest technology.

As the Manager of the Biomedical Engineering department I have been afforded the opportunity to see the latest technology available that will allow the medical staff to better serve children in remote areas. There is a clear need for the hospital to purchase new equipment available on the market today. A grant such as this will greatly help with our efforts to create a Telemedicine program that will support the mission of the hospital.

Please award this grant to the Children's Hospital of Alabama and help us continue to provide excellent patient care with the latest technology.

Sincerely,

Kelvin Knight

Kelvin Knight, M.S., CBET
Manager, Biomedical Engineering Department